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SILICON METAL FROM CANADA

Determination of No Injury in Investigation No. AA1921-192 Under the Antidumping Act, 1921, as Amended, Together With the Information Obtained in the Investigation

ORIGINAL

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United States International Trade Commission / Washington, D.C. 20436

I

UNITED STATES INTERNATIONAL TRADE COMMISSION

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USITC REPORTS NO INJURY TO U.S. INDUSTRY FROM LTFV IMPORTS OF SILICON METAL FROM CANADA

The United States International Trade Commission today reported to the Secretary of the Treasury its determination, by a 4-to-1 vote, that there is no injury or likelihood of injury or prevention of establishment of an industry in the United States by reason of sales of silicon metal from Canada at less than fair value (LTFV) within the meaning of the Antidumping Act, 1921, as amended.

Vice Chairman Bill Alberger and Commissioners George M. Moore, Catherine Bedell, and Paula Stern concurred in the determination. Chairman Joseph O. Parker dissented.

The Commission investigation began on December 15, 1978, after receipt of a determination of LTFV sales from the Treasury Department. A public hearing in connection with the investigation was held on January 23, 1979, in Washington, D.C.

Silicon metal is used predominantly in the non-ferrous metal industry--chiefly by aluminum producers--to improve casting fluidity and wear resistance, and in the chemical industry to produce silicone. Six domestic firms produce silicon metal at eight facilities located in West Virginia, Ohio, Alabama, Oregon, and Washington.

The Treasury Department found that virtually all imports of silicon metal from Canada during the period examined--September 1977 to February 1978--were produced by SKW Electro-Metallurgy Canada, Ltd. (SKW), and therefore limited its investigation to that firm. Fair-value comparisons made on virtually all sales by SKW in the United States during the period examined revealed LTFV margins ranging from 0.4 percent to 18.3 percent on 44 percent of the sales compared. The weighted average margin on all sales compared was 2.7 percent.

Imports climbed from 9,000 tons in 1976 to 26,100 tons in 1977 and continued to rise during 1978--reaching 34,500 tons, or almost one-third more than in 1977. Four countries---Canada, Norway, the Republic of South Africa, and Yugoslavia--accounted for 90 percent of imports in 1977 and 1978. Imports from Canada rose from 540 tons in 1976 to almost 11,000 tons in 1977. However, in contrast to the increase in aggregate U.S. imports of silicon metal during 1978, imports from Canada declined by about 5 percent. Most of these other imports were predominantly at prices lower than those of Canadian product.

Apparent U.S. consumption of silicon metal increased from 92,400 tons in 1975 to 158,500 tons in 1978, an all-time high and 13 percent more than consumption in 1977. Increasing consumption, plus rising producers' shipments, sharply reduced producers' inventories, increased capacity, an upward turn in profit, and rising prices characterize the domestic industry today.

The Commission's public report, Silicon Metal From Canada (USITC Publication 954), contains the views of the Commissioners in the investigation (No. AA1921-192). Copies may be obtained by calling (202) 523-5178 or from the Office of the Secretary, 701 E Street NW., Washington, D.C. 20436.

CONTENTS

	Page
Determination of no injury	1
Statement of reasons of Commissioners Bill Alberger, George M. Moore, and Catherine Bedell	2
Statement of reasons of Commissioner Paula Stern	8
Statement of reasons of Chairman Joseph O. Parker	15
Information obtained in the investigation:	
Summary	A-1
Introduction	A-3
The product:	
Description and uses	A-3
U.S. tariff treatment	A-5
U.S. producers	A-5
Canadian producers	A-8
Nature and extent of LTFV sales	A-8
U.S. consumption	A-9
U.S. imports	A-9
Consideration of injury or likelihood thereof:	
U.S. production and capacity utilization	A-12
U.S. producers' shipments and intracompany transfers	A-14
Inventories	A-17
Employment	A-18
Profit-and-loss experience	A-20
Consideration of the causal relationship between LTFV imports from Canada and the alleged injury:	
Market penetration of LTFV imports	A-22
Lost sales	A-23
Prices:	
U.S. producers	A-24
Comparison of domestic and import prices	A-25
Appendix A. Treasury Department's letter to the Commission advising of its determination of LTFV sales from Canada	A-27
Appendix B. U.S. International Trade Commission notice of investigation and hearing on silicon metal from Canada	A-29
Appendix C. Statistical tables	A-31

Figures

1. Silicon metal: U.S. and Canadian producing establishments, and imports from Canada by customs districts, 1977	A-6
2. Silicon metal: Apparent U.S. consumption, domestic shipments, and imports, 1968-78	A-10
3. Indexes of U.S. consumption of silicon metal and production of aluminum, 1968-77	A-11
4. Silicon metal: U.S. imports, total and from Canada, 1973 78	A-13
5. Silicon metal: U.S. production, shipments, and intracompany consumption, 1974-78	A-15

CONTENTS

		Page
1.	Silicon metal: U.S. production, producers' shipments and intra-company transfers, imports for consumption, and apparent U.S. consumption, 1974-78	A-32
2.	Silicon metal: Reported U.S. consumption, by major end uses, 1973-77	A-33
3.	Silicon metal: U.S. imports for consumption, by principal sources, 1974-78	A-34
4.	Silicon metal: U.S. imports for consumption from Canada, by months, 1976-78	A-35
5.	Silicon metal: U.S. imports for consumption, by specified sources and by customs districts, 1977	A-36
6.	Profit-and-loss experience of U.S. producers of silicon metal on all operations of the establishments or divisions within which silicon metal was produced, and on operations on silic metal, 1974-77 and January-September 1978	A-37
7.	Silicon metal: Range of prices and weighted average price of the product sold by U.S. producers to their largest customers, by silicon specifications and by quarters, 1976-78	A-38
8.	Silicon metal: U.S. producers' list prices, by grades and by date of price changes, 1974-78	A-39
9.	Prices at which * * * purchased silicon metal, by countries and by quarters, July 1976-December 1978	A-41
10.	Prices at which * * * purchased silicon metal, by countries and by quarters, 1978	A-42

Note.--Information which would disclose confidential operations of individual concerns may not be published and therefore has been deleted from this report. Deletions are indicated by asterisks.

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

[AA1921-192]

SILICON METAL FROM CANADA

Determination of No Injury

On December 5, 1978, the United States International Trade Commission received advice from the Department of the Treasury that silicon metal from Canada is being, or is likely to be, sold in the United States at less than fair value within the meaning of the Antidumping Act, 1921, as amended (19 U.S.C. 160(a)). Accordingly, on December 15, 1978, the Commission instituted investigation No. AA1921-192 under section 201(a) of the act to determine whether an industry in the United States is being or is likely to be injured, or is prevented from being established, by reason of the importation of such merchandise into the United States. Notice of the institution of the investigation and of the public hearing held in connection therewith was published in the Federal Register on December 21, 1978 (43 F.R. 59555). On January 23, 1979, a hearing was held in Washington, D.C., at which time all interested persons were provided the opportunity to appear by counsel or in person.

On the basis of its investigation, the Commission determines (Chairman Parker dissenting) that an industry in the United States is not being and is not likely to be injured, and is not prevented from being established, by reason of the importation of silicon metal from Canada that is being, or is likely to be, sold at less than fair value within the meaning of the Antidumping Act, 1921, as amended.

In arriving at its determination, the Commission gave due consideration to all written submissions from interested persons and information adduced at the hearing as well as information provided by the Department of the Treasury and data obtained by the Commission's staff from questionnaires, personal interviews, and other sources.

Statement of Reasons of Commissioners Bill Alberger,
George M Moore and Catherine Bedell

In order for the Commission to find in the affirmative in an investigation under the Antidumping Act, 1921, as amended (19 U.S.C. 160(a)), it is necessary to find that an industry in the United States is being or is likely to be injured, or is prevented from being established, 1/ and the injury or likelihood thereof must be by reason of imports at less than fair value (LTFV).

Determination

On the basis of the information obtained in this investigation, we determine that an industry in the United States is not being and is not likely to be injured by reason of the importation of silicon metal from Canada which the Secretary of the Treasury has determined is being, or is likely to be, sold at LTFV.

The imported article and the domestic industry

For the purposes of this investigation silicon metal has a silicon content ranging from 96 percent to 99.7 percent. The balance is composed of varying quantities of other elements, chiefly iron, aluminum, and calcium. It is used predominantly in the nonferrous metals industry as an alloying constituent to improve casting fluidity and wear resistance of aluminum alloys and by the chemical industry in the production of silicones. In this determination we consider the relevant domestic industry to consist of the facilities in the United States devoted to the production of silicon metal. Six firms currently produce silicon metal at eight establishments in the United States.

1/ Prevention of the establishment of an industry is not an issue in this investigation and will not be discussed further.

LTFV sales

The Department of the Treasury found that virtually all imports of silicon metal from Canada during the period examined--September 1, 1977-February 28, 1978--were produced by SKW Electro-Metallurgy Canada, Ltd. (SKW), and therefore limited its investigation to sales by that firm. Fair-value comparisons were made on virtually all sales by SKW in the United States during the period of Treasury's investigation. LTFV margins ranging from 0.4 percent to 18.3 percent were found on 44 percent of the sales compared. The weighted average margin on all sales compared was 2.7 percent.

The question of injury by reason of LTFV sales

As discussed below, the record in this investigation contains some evidence of injury to the domestic industry producing silicon metal. It is clear, however, that whatever injury this industry has experienced is not by reason of LTFV imports from Canada.

U.S. consumption.--Apparent U.S. consumption of silicon metal dropped by over one-third between 1974 and 1975, a recession year--from 137,600 tons to 92,400 tons. Consumption has increased each year since 1975 and amounted to 158,500 tons in 1978, a record high and 71 percent more than consumption in 1975.

U.S. production and capacity utilization.--Annual U.S. production of silicon metal fluctuated widely during 1974-78--dropping by over one-fourth in 1975, recovering to a record high in 1976, and falling again in 1977 and 1978. U.S. capacity to produce silicon metal expanded by 57 percent from 1974 to 1978. As a result of the growth in capacity, the decline in production, and the working-off of high inventories, the rate of capacity utilization fell from 95 percent in 1976 to 54 percent in 1978.

U.S. producers' shipments.--During 1974-78 U.S. producers' shipments of silicon metal--including exports and intracompany transfers--peaked in 1976, declined by 11 percent in 1977, and then increased in 1978 to the record high level attained in 1976. Open-market shipments to domestic purchasers in 1978 were 1 percent less than those during the peak year of 1976. Despite the contention of the domestic producers that the impact of LTFV sales has been felt most markedly in the secondary aluminum market, their shipments to that market in 1978 rose to the second highest level reported during the 1974-78 period.

Inventories.--U.S. producers' stocks of silicon metal rose substantially during 1974-77, but were sharply reduced during 1978. Stocks held at the close of 1978 were at the lowest level since 1974.

Employment.--The average number of production and related workers engaged in operations on silicon metal, and the number of man-hours worked by such employees, fell by almost one-third from 1976 to 1978. The coming on stream of new productive facilities, improvements in existing production facilities, and the closing of older, less efficient facilities sharply increased worker productivity in this industry during 1976-78. Such increased productivity, rather than reduced output, accounts for the bulk of the decline in employment.

Imports and market share.--U.S. imports of silicon metal dropped sharply between 1974 and 1975--from 19,000 tons to 6,900 tons. Imports increased in 1976 to 9,400 tons and then climbed to 26,100 tons in 1977. Imports continued to rise in 1978--reaching 34,500 tons, or almost one-third more than during 1977. The ratio of imports to apparent consumption fell from 13.8 percent in 1974 to 6.9 percent in 1976, then rose to 18.6 percent in 1977 and 21.7 percent in 1978.

Imports from Canada rose from 540 tons in 1976 to almost 11,000 tons in 1977. However, in contrast to the one-third increase in aggregate U.S. imports of silicon metal during 1978, imports from Canada declined by about 5 percent. Based on the assumption that 44 percent of the imports from Canada in 1977 and 1978 were at LTFV (the percentage found by Treasury during the period of its investigation), such LTFV imports accounted for 3.4 percent and 2.9 percent, respectively, of apparent consumption in those years. Thus, fair value imports from all sources accounted for 15.2 percent and 18.8 percent of apparent consumption in the same years.

Profitability.--U.S. producers' profits from silicon metal operations have declined substantially since 1974, an exceptionally good year in which the industry reported a net operating profit of $19.5 million. Although the industry reported an operating loss of $1.4 million in 1977, three of the five market producers were able to operate at a profit in that year. Net operating profit recovered somewhat to $1.1 million in January-September 1978. Much of the decline in the industry's profits is attributable to the overexpansion of U.S. production capacity which in turn has resulted in the underutilization of facilities and increased depreciation costs.

Lost sales.--The Commission contacted 20 firms where U.S. producers alleged they had lost sales of silicon metal to LTFV imports from Canada in 1977 and 1978. Only three of these firms acknowledged that they had reduced their purchases of domestically produced silicon metal during those years and all of the purchases of Canadian silicon metal made by one of these firms during the period of Treasury's investigation consisted of imports entered at fair value. In most cases, firms alleged by domestic producers to have reduced their purchases of domestically made silicon metal in 1977 and 1978 advised that imports from Canada

supplied their increased requirements for silicon metal, or that imports from Canada displaced imports from other countries. Furthermore, the dumping margins on the bulk of SKW's sales were sufficiently small in relation to the margin by which these imports undersold U.S. producers that had they been eliminated entirely SKW would have still undersold the U.S. producers.

Prices.--After remaining stable during 1976, U.S. producers' prices were increased by about 7 percent in early 1977. In July 1977 these increases were rescinded. General supply and demand conditions--including the presence in the marketplace of substantial quantities of imported silicon metal from countries other than Canada, at prices less than those of SKW--were the principal factors that caused the price rescission by the domestic producers. In 1978 U.S. producers increased their list prices for silicon metal by approximately 15 percent.

No likelihood of injury by reason of LTFV sales

With consumption increasing, producers' shipments rising, sharply reduced producers' inventories, the upward turn in profits, and rising prices, there is no likelihood of injury to the domestic industry. Moreover, SKW--the only Canadian producer of silicon metal for export to the United States has no excess capacity with which to threaten the domestic industry. In 1978 SKW reported that it operated at full capacity, and its sales in that year exceeded its production, thus it has no overhang of inventories to dispose of in the U.S. market. Furthermore, SKW has advised that it has adjusted its pricing policy to the United States in accordance with Treasury's formula in order to insure that no further LTFV sales take place.

Conclusion

We are satisfied from the above considerations that the domestic industry producing silicon metal is not being and is not likely to be injured by reason of the importation of silicon metal from Canada found by the Secretary of the Treasury to be, or likely to be, sold in the United States at LTFV.

STATEMENT OF REASONS OF COMMISSIONER PAULA STERN

Having considered all the information before me in this investigation, I have determined, pursuant to Section 201 of the Antidumping Act of 1921, as amended, that an industry in the United States is not being or likely to be injured, or prevented from being established by reason of the importation into the United States of silicon metal from Canada. In making this determination, I found that the pricing practices of the Canadian exporter into the United States of silicon metal would have raised serious questions under the statute, but that the domestic industry in this investigation is not presently or likely to be suffering injury.

The Domestic Industry

Silicon metal is produced from abundant and relatively inexpensive silica raw materials through a process of washing, crushing, screening in some instances, and smelting. The process requires large amounts of energy which is, therefore, a major cost element for the industry. The bulk of silicon metal has a silicon content of from 97.5 percent to 99 percent and contains varying amounts of iron, aluminum, calcium and other elements. Although substitutable in certain respects, different grades of silicon metal have different applications. The most common use of silicon metal, from 40 percent to 50 percent of domestic consumption, is by the secondary aluminum industry (recycled aluminum), where price is the critical determinant for purchases. Chemical production accounts for roughly one-third of domestic silicon metal consumption and primary aluminum production accounts for less than 20 percent. These producers are more quality conscious than the secondary aluminum producers.

Silicon metal is presently produced at eight facilities in the United States owned by six firms -- Union Carbide Corp.; Interlake Inc.; Hanna Mining Co.; Kawecki Berylco Industries, Inc.; Ohio Ferro-Alloys Corp.; and Reynolds Metal Co., which produces chiefly for its own use. While silicon metal production represents only a segment of the operations of all the firms in the industry, separate data, including allocations for general and administrative expenses, were available for silicon metal production segments of each firm producing chiefly for the open market and I was able to review all aspects of the silicon metal industry as an independent entity.

Imports

During the period of the Commission's review, 1974-1978, overall imports initially declined, but by the end of the period they accounted for an increased share of the U.S. market. Following the industry's boom year of 1974, when the ratio of imports to domestic consumption was 13.8 percent, imports dropped to 7.5 percent and 6.9 percent in 1975 and 1976, respectively, before increasing substantially to 18.6 percent in 1977 and 21.7 percent in 1978. Presently, four countries -- Canada, Norway, the Republic of South Africa and Yugoslavia -- account for approximately 90 percent of imports.

Since 1977, Canada has been the largest source of silicon metal imported into the United States, exporting 10,934 short tons in 1977 and 10,388 short tons in 1978 -- 42 percent and 30 percent of total U.S. imports for those years. Until the latter part of 1976, however, Canadian exports to the United States were negligible. At that time, SKW Electro-Metallurgy Canada, Ltd. (SKW), became the sole Canadian exporter of silicon metal to the United States when it began operating by opening new facilities.

Treasury Department price comparisons on virtually all of SKW's imports into the United States during the period of September 1977 through February 1978 revealed that 44 percent of its sales in the United States were at less than fair value margins ranging from .4 percent to 18.3 percent. Treasury determined that the average less than fair value margin for all Canadian imports, including those at fair value, was 2.7 percent; the average margin on less than fair value imports was 6.2 percent.

Injury

Section 201 of the Antidumping Act, as amended, does not set forth standards for determining whether an industry is being or is likely to be injured by reason of less than fair value imports. As a result, the Commission can and does exercise considerable discretion in making its determinations based upon the particular facts in each case. However, as I originally stated in my opinion on steel wire nails (Investigation No. AA1921-189), Section 201 of the Act requires the Commission to find that two conditions have been satisfied before an affirmative determination can be made. First, the Commission must determine that an industry is being or is likely to be injured. This determination is based upon an analysis of certain economic indicators -- consumption, production, capacity changes and utilization, shipments, inventory levels, employment and profits. Second, the Commission must determine that the injury is "by reason of" the less than fair value imports. As for likelihood of injury, foreign capacity to produce for export is also considered. Of course, these indicators are merely illustrative, since a definitive set of factors for all cases is not possible. If the Commission finds that either condition has not been met, its determination

must be negative, and it need not consider factors relevant to determining the other condition.

In the present investigation, I found that the domestic industry is not being or likely to be injured. However, I considered a straightforward analysis of traditional economic indicators inappropriate in this case because of the existence of a number of factors which complicated the industry situation. The first and most important of these factors was the decision by all of the domestic producers during the boom years of 1972-1974 to expand capacity. The bulk of the new capacity became operative during 1975 and 1976; and in the entire period of our review, capacity increased by 57 percent. This increased capacity depressed capacity utilization figures (down to just over 54 percent in 1978) to a far greater extent than did declines in production.

Second, since 1974, labor productivity (output of product per manhour) in the domestic industry has increased by 37 percent. This increasing productivity -- the result of adding new facilities, improving existing facilities, and closing older less efficient facilities -- is a sign of the industry's health, not injury. In the same period that the 37 percent increase in productivity occurred, employment of production and related workers declined by 37 percent and manhours worked by these employees declines by 35 percent. Thus, declines in employment are largely attributable to productivity increases rather than to declines in production.

Third, large fluctuations in the domestic silicon metal industry's inventory levels mask a positive pattern of demand for domestic production. Particularly, in 1975 and 1976, the domestic industry produced more silicon than it shipped or disposed of through intra-company transfers; and inventories more than doubled

from 1974 through 1977. In 1978 the domestic industry disposed of much of this excess inventory and the industry's inventory levels dropped to their lowest levels of the entire period. This caused a 15 percent differential in production between 1976 and 1978. Shipments and transfers in 1978, however, matched the all time high of 1976 -- in both years nine percent above the boom year of 1974.

Fourth, the industry profit picture is replete with apparent contradictions. Since 1975, overall industry profits as a percent of net sales have been somewhat below those of manufacturing industries generally and of the non-ferrous metal producers industry. However, the industry has shown an overall loss only in 1977, and returned to profitability in 1978. Further, the experience of individual firms varied tremendously. Two of the five firms selling silicon metal on the open market consistently showed high levels of profits, far above the averages of manufacturing concerns and non-ferrous metal producers. Another firm was profitable in every year until 1978, when it showed a slight loss. Of the remaining two firms, one showed inordinately low profits even in the boom year of 1974, and since then has been consistently unprofitable due largely to its pricing policies. The fifth firm showed virtually no profit in 1976 and losses in 1977 and 1978, commensurate with large increases in depreciation costs associated with new facilities.

In sum, during the period under review, the domestic industry built considerable new facilities, improved its productivity, and saw demand for its production reach new highs. Overall profits are low, but this is to be

expected during a period of expansion as new facilities begin operating and older facilities close down. However, 1978 saw the industr eturn to profitability following its only year of loss. Further, a significant portion of the industry has shown high levels of profitability throughout the review period, demonstrating that the economic weaknesses in some of the firms is not an industry-wide phenomenon. Thus, I found that the industry as a whole is not being injured.

Nor do I find any likelihood of injury by reason of less than fair value imports. In this regard, the Commission received information that SKW is presently shipping at full capacity, and there is no indication that SKW is contemplating any expansion of capacity. In addition, world demand for aluminum, a light, versatile, widely-utilized metal, is rising. As a result, worldwide demand for silicon metal will also increase. Consistent with this worldwide trend, the Bureau of Mines projects that U.S. demand for silicon materials will increase by an average of 3 percent per year through 1985. Further, SKW has stated that it has revised its pricing policy consistent with Treasury's method for calculating less than fair value to avoid future less than fair value sales. Finally, following a period of relative price stagnation, prices of silicon metal sold by U.S. producers increased twice during 1978, indicating that increased demand for silicon metal should translate in the future into increasing levels of profitability.

Conclusion

Although I have found that the domestic silicon metal industry is not being injured or likely to be injured by reason of less than fair value imports, I am concerned about the aggressive pricing practices of SKW, particularly

during 1977. SKW's sales are concentrated in the secondary aluminum producers' market. As previously noted, this segment is the most price conscious with respect to silicon metal purchases and hence most vulnerable to less than fair value imports. Further, while the average less than fair value margin found by Treasury on all Canadian imports was not large, 2.7 percent, the wide range of less than fair value margins in individual transactions indicates that SKW consciously negotiated prices to make sales. In view of this information, had I found that the domestic industry is being injured or likely to be injured, SKW's pricing practice would have raised serious questions under the statute.

Statement of Reasons of Chairman Joseph O. Parker

On December 5, 1978, the United States International Trade Commission received advice from the Department of the Treasury that silicon metal from Canada is being, or is likely to be, sold in the United States at less than fair value (LTFV) within the meaning of the Antidumping Act, 1921, as amended (19 U.S.C. 160(a)). Accordingly, on December 15, 1978, the Commission instituted investigation No. AA1921-192 under section 201(a) of the act to determine whether an industry in the United States is being or is likely to be injured, or is prevented from being established, 1/ by reason of the importation of such merchandise into the United States.

Determination

On the basis of the information obtained in this investigation, I determine that an industry in the United States is being injured or is likely to be injured by reason of the importation of silicon metal from Canada which the Secretary of the Treasury has determined is being, or is likely to be, sold at LTFV.

The imported article and the domestic industry

For purposes of its investigation, Treasury defined the subject merchandise as silicon metal, unwrought, containing by weight not over 99.7 percent pure silicon; and alloys of silicon metal, unwrought, containing by weight 96 percent or more but less than 99.0 percent silicon. Such imports are classified under items 632.4200 and 632.8420 of the Tariff Schedules of the United States Annotated. Most silicon metal, including that produced in the United States and that imported

1/ Prevention of the establishment of an industry is not an issue in this investigation and will not be discussed further.

from Canada, has a silicon content of about 97.5 percent to 99 percent. In commerical practice, silicon is sold by grades, distinguished by the impurities in the metal. Silicon is used predominantly in the nonferrous metals industry--chiefly by aluminum producers--to improve casting fluidity and wear resistance, and in the chemical industry to produce silicone. Six firms currently produce silicon metal at eight establishments in the United States.

LTFV sales

The Department of the Treasury found that virtually all imports of silicon metal from Canada during the period examined--September 1, 1977-February 28, 1978--were produced by SKW Electro-Metallurgy Canada, Ltd. (SKW), and therefore limited its investigation to sales by that firm. Fair-value comparisons made on virtually all sales by SKW in the United States during the period examined revealed LTFV margins ranging from 0.4 percent to 18.3 percent on 44 percent of the sales compared. The weighted average margin, if applied to all sales of SKW, whether or not sold at LTFV, would amount to 2.7 percent. The weighted average margin on all sales found to have been at LTFV was 6.2 percent.

Injury by reason of LTFV sales

In my judgment, the information obtained in this investigation establishes that SKW's unfair pricing practices cause injury to the domestic industry which the Antidumping Act is designed to prevent. The purpose of the act is clear from the legislative history:

> . . . the Act is primarily concerned with the situation in which the margin of dumping contributes to underselling the U.S. product in the domestic market, resulting in injury or likelihood of injury to a domestic industry. Such injury may be manifested by such indicators as

> suppression or depression of prices, loss of customers, and penetration of the U.S. market. When clear indication of injury, or likelihood of injury, exists there would be reason for making an affirmative determination. The Antidumping Act is designed to discourage and prevent foreign suppliers from using unfair price discrimination practices to the detriment of a United States industry. 1/

The legislative history is also clear that, to protect domestic industries from unfair pricing, it must only be established that the level of injury is "that degree of injury which the law will recognize . . . [as] more than frivolous, inconsequential, insignificant, or immaterial." 2/ Moreover, as the Senate Finance Committee pointed out that injury caused by unfair competition such as dumping does not require as strong a causation link as is required under fair trade conditions. 3/

A comparison of various indicators of the industry's economic health prior to 1977--the year established by Treasury as encompassing the onset of LTFV sales--with conditions in 1977 and 1978 shows a declining rate of capacity utilization, a decrease in production and shipments, an increase in inventories, a drop in employment, and a precipitous decline in profitability.

Imports of silicon metal from Canada, all from SKW, jumped from 540 tons in 1976 to almost 11,000 tons in 1977. SKW reported to the Commission that its sales to U.S. customers in 1978 were substantially greater, in terms of quantity, than in 1977. During 1973-76, imports from Canada accounted for 1 percent or less of apparent annual domestic consumption; in 1977, such imports accounted for 7.8 percent. The principal market to which these imports from Canada went is the secondary aluminum market which is the largest single domestic market for silicon metal and the

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1/ Trade Reform Act of 1974: Report of the Committee on Finance . . ., S. Rept. No. 93-1298, (93d Cong., 2d sess.), 1974, p. 179.

2/ Ibid., p. 180.

3/ Ibid.

most price sensitive. Canadian imports to this market increased from 0 in January-September 1976 to a 10- to 15-percent share in 1977. Imports from SKW remained at about the same level in 1978 as in 1977.

From the information obtained in the investigation, it is clear that LTFV pricing provided competitive advantage and was a major factor in SKW's ability to penetrate the market at a time when domestic producers had excess capacity. The majority of SKW's shipments of silicon metal to the U.S. secondary aluminum market were at LTFV with margins ranging to more than 5 cents per pound of silicon content. The Commission investigation revealed that SKW was continually underselling the domestic producers in this market and that, in many instances, the margins of dumping were approximately the same as the margins by which SKW undersold the domestic product.

The majority of shipments to other U.S. markets were also made at LTFV, and SKW continually undersold domestic producers in these markets as well. Thus, it is clear that the majority of SKW's shipments were sold at a price below that of domestic producers and at less than fair value in order to penetrate the U.S. market and reach almost 100 percent capacity utilization of SKW's newly established facilities.

The pricing information available to the Commission also reveals that, notwithstanding rising costs, domestic producers' prices of both grades of silicon sold by SKW actually declined from the middle of 1977 to the middle of 1978. Since SKW accounted for the great bulk of the increased imports during this period and, as mentioned, was underselling the domestic producers, it is clear that such imports contributed to the depression of U.S. producers' prices.

In my judgment, the Commission's investigation establishes the very indications of injury, depression of prices, loss of customers, and penetration of the U.S. market that the legislative history reveals the Antidumping Act was designed to prevent. This investigation also establishes that the injury to the domestic industry is more than frivolous or insignificant and that it was by reason of Canadian LTFV imports within the meaning of the act.

INFORMATION OBTAINED IN THE INVESTIGATION

Summary

The United States International Trade Commission instituted investigation No. AA1921-192 on December 15, 1978, following notification from the Department of the Treasury on December 5, 1978, that silicon metal from Canada is being, or is likely to be, sold in the United States at less than fair value (LTFV) within the meaning of the Antidumping Act, 1921, as amended. The petition which led to Treasury's determination of LTFV sales was filed on behalf of four domestic producers of silicon metal. A public hearing in connection with the Commission's investigation was held on January 23, 1979, in Washington, D.C.

Most silicon metal, including that produced in the United States and that imported from Canada, has a silicon content of from about 97.5 percent to 99 percent. It is used predominantly in the nonferrous metals industry--chiefly by aluminum producers--to improve casting fluidity and wear resistance, and in the chemical industry to produce silicone. Six firms produced silicon metal at eight establishments in the United States during 1978; one firm is a major aluminum producer and its output of silicon metal is chiefly for captive consumption.

Apparent U.S. consumption of silicon metal dropped by one-third between 1974 and 1975--from 137,600 tons to 92,400 tons. Consumption has increased since 1975 and amounted to 158,500 tons in 1978, an alltime high and 13 percent more than consumption in 1977. In recent years, about 95 percent of the silicon metal consumed domestically was used in producing aluminum alloys and silicone. Silicon metal is used by both primary and secondary aluminum producers.

U.S. imports of silicon metal dropped sharply between 1974 and 1975--from 19,000 tons to 6,900 tons. After partially recovering in 1976 to 9,400 tons, imports climbed to 26,100 tons in 1977. Imports continued to rise in 1978--reaching 34,500 tons, or almost one-third more than in 1977. The ratio of imports to apparent consumption jumped from 6.9 percent in 1976 to 18.6 percent in 1977, and increased further to 21.7 percent in 1978. Four countries--Canada, Norway, the Republic of South Africa, and Yugoslavia--accounted for about nine-tenths of total imports in 1977 and 1978.

Canada's role as a supplier of silicon metal to the United States has undergone a dramatic shift in the past 2 years. That country was a relatively minor source of silicon metal imports until the latter part of 1976, but since that time it has been the largest source. Imports of silicon metal from Canada rose from 540 tons in 1976, or 6 percent of total imports, to almost 11,000 tons in 1977--equivalent to 42 percent of the total. However, in contrast to the one-third increase in aggregate U.S. imports of silicon metal in 1978, imports from Canada declined by 5 percent.

Treasury's investigation of U.S. imports of silicon metal from Canada covered the 6-month period September 1, 1977, through February 28, 1978. It found that virtually all imports during that period were produced by SKW Electro-Metallurgy Canada, Ltd., and limited its investigation to sales by that firm; SKW began production in Canada in mid-1976. A comparison of purchase prices to

U.S. customers with home-market prices of such or similar merchandise resulted in LTFV margins ranging from 0.4 percent to 18.3 percent on 44 percent of sales compared; the weighted average margin on all sales compared was 2.7 percent. If it is assumed that the same percentage of total U.S. imports of silicon metal from Canada in 1977 and 1978 was sold at LTFV, such LTFV imports were equal to 3.4 percent and 2.9 percent of apparent domestic consumption in those years, respectively.

U.S. annual production of silicon metal fluctuated widely during 1974-78--dropping by more than one-fourth in 1975, recovering in 1976 to an alltime high, falling again by about 12 percent in 1977, and slipping an additional 4 percent in 1978. Although production evidenced no clear trend during the period, U.S. capacity to produce silicon metal expanded by 57 percent. Consequently, the rate of utilization of productive capacity fell from a high of 95 percent in 1974 to a 5-year low of 54 percent in 1978.

Fluctuations in U.S. producers' domestic market shipments during 1974-77 paralleled changes in production. In 1978, however, shipments rose while production continued to decline. The result was the working off of the "excessive" stocks of silicon metal that domestic producers had built up during 1974-77. U.S. producers' intracompany transfers (i.e., captive consumption) of silicon metal rose from an average of * * * tons in 1974 and 1975 to an average of * * * tons annually during 1976-78. Trends in the value of producers' shipments and intracompany transfers were the same as trends in terms of quantity. The average unit value of shipments and transfers rose from 39 cents per pound in 1974 to 44 cents per pound in 1975, and then remained virtually unchanged during 1976-78.

The average number of production and related workers engaged in operations on silicon metal, and the number of man-hours worked by such employees, fell by almost one-third from 1976 to 1978. A substantial portion of the reduced employment appears to be related to sharp increases in worker productivity that have occurred since 1975.

U.S. market producers' net income from operations on silicon metal dropped sharply from 1974 to 1977, but recovered somewhat during January-September 1978. Corresponding with a 20 percent decline in net sales and intracompany transfers of silicon metal, net operating income fell from $19.5 million in 1974 (equivalent to 22.4 percent of sales and transfers) to $4.8 million (6.8 percent) in 1975. Despite a recovery in sales in 1976 to a level greater than that reached in 1974, operating income from silicon metal operations continued to decline--to $2.2 million (2.3 percent). Both sales and operating income slipped in 1977, the latter to a loss of $1.4 million (1.6 percent). A net operating profit of $1 million (1.5 percent) was recorded during January-September 1978. In comparison with the financial performance of most U.S. manufacturing firms and firms in the nonferrous metals industry, silicon metal producers fared much better in 1974, about the same in 1975, and considerably worse since then.

U.S. producers' prices for silicon metal remained stable in 1976. In early 1977 increases amounting to about 7 percent took place. However, in July of that year the previous increases were rescinded. Prices evidenced some further slight declines during the latter part of 1977 and the first quarter of

1978. Following an apparent increase in demand in early 1978, prices were again increased and continued to move upward throughout the year. During the period of Treasury's investigation, the prices of domestically produced silicon metal were generally about 3 cents per pound more than comparable grades of the product from Canada.

Introduction

On December 5, 1978, the United States International Trade Commission received advice from the Department of the Treasury that silicon metal from Canada is being, or is likely to be, sold in the United States at less than fair value within the meaning of the Antidumping Act, 1921, as amended (19 U.S.C. 160(a)). 1/ Accordingly, on December 15, 1978, the Commission instituted investigation No. AA1921-192 under section 201(a) of the act to determine whether an industry in the United States is being or is likely to be injured, or is prevented from being established, by reason of the importation of such merchandise into the United States. For the purposes of Treasury's determination, the term "silicon metal" was defined as silicon metal, unwrought, containing by weight not over 99.7 percent pure silicon, and alloys of silicon metal, unwrought, containing by weight 96 percent or more but less than 99.0 percent silicon. By statute, the Commission must render its determination within 3 months of its receipt of advice from Treasury, or in this case, by March 5, 1979.

Notice of the institution of the Commission's investigation and the public hearing to be held in connection therewith was given by posting copies of the notice at the Office of the Secretary, U.S. International Trade Commission, Washington, D.C., and at the Commission's office in New York City, and by publishing the notice in the Federal Register of December 21, 1978 (43 F.R. 59555). 2/ The public hearing was held in Washington, D.C., on January 23, 1979.

The complaint which led to Treasury's determination of sales at LTFV was filed by counsel representing four domestic producers of silicon metal--the Ohio Ferro-Alloys Corp., Union Carbide Corp., Interlake, Inc., and Kawecki Berylco Industries, Inc. Treasury's notice of investigation, withholding of appraisement, and determination of sales at LTFV were published in the Federal Registers of February 14, 1978 (43 F.R. 6350), August 29, 1978 (43 F.R. 38659), and December 7, 1978 (43 F.R. 57371), respectively.

The Product

Description and uses

Silicon is a stable, relatively light, chemical element second only to oxygen in abundance in the Earth's crust. Silicon does not occur free in nature, but is found combined with oxygen as silica or with oxygen and other elements

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1/ A copy of Treasury's letter to the Commission concerning LTFV sales from Canada is presented in app. A.

2/ A copy of the Commission's notice of investigation and hearing is presented in app. B.

(iron, aluminum, calcium, and so forth) as silicates. Domestic silica deposits of quartz, quartzite, and sandstone, the resource materials for silicon, are virtually limitless and can sustain industry requirements indefinitely at present rates of consumption.

Most silicon metal, including that produced in the United States and that imported from Canada, has a silicon content of from about 97.5 percent to 99 percent. 1/ Within this range, the content of iron and other elements, chiefly aluminum and calcium, may vary. Commercial grades of silicon metal are typically sold by reference to the iron content of the product (e.g., 1 percent iron).

Silicon metal is used predominantly in the nonferrous metals industry--chiefly by aluminum producers--and in the chemical industry. The addition of silicon to aluminum improves its casting fluidity and wear resistance. Its use in other nonferrous metals improves such qualities as strength, wear resistance, and machinability. Silicon metal is used by the chemical industry in the production of silanes, which, in turn, are used in the manufacture of silicone resins, lubricants, plastomers, antifoaming agents, and water-repellent compounds. Silicon metal is also used as the starting material for the production of high-purity silicon metal (i.e., that containing more than 99.7 percent silicon) for use in semiconductor applications by the electronics industry. Relatively minor amounts of silicon metal are also used in producing steel alloys, cast iron, and certain superalloys.

Silica raw materials require only washing, crushing, and screening prior to smelting. High-grade quartzite, the preferred raw material of silicon metal producers, requires only crushing and sizing. The beneficiated raw materials and coke or charcoal as a reductant are measured, blended, and charged into an electric arc furnace. 2/ Such furnaces vary from 10 to 40 feet in diameter and from 20 to 40 feet in height, and are typically capable of processing 150 to 200 tons per day. The furnaces are tapped periodically and the molten silicon is drawn and cast into ingots. The ingots are then crushed and sized for shipment.

1/ Ferrosilicon, an alloy of iron and silicon, and silicon metal containing by weight more than 99.7 percent silicon are not included in the scope of this investigation. The latter is a relatively highly specialized product used principally in the electronics industry. It is produced by firms and by processes that differ from those covered by this investigation. Ferrosilicon is used in the iron and steel industry to deoxidize molten metal and to improve strength and wear resistance. The silicon content of ferrosilicon accounts for about two-thirds of total U.S. consumption of silicon.

2/ The smelting processes for silicon metal and ferrosilicon are similar except that iron or steel scrap is added to the charge when producing ferrosilicon. In practice, however, switching from the production of silicon metal to ferrosilicon (or other ferroalloys) and back again to silicon metal is undesirable and is done infrequently. Silicon metal can only be produced in furnaces free of contamination by iron residue. If ferroalloys are produced in a furnace that is used for producing silicon metal, the furnace becomes contaminated with iron residue and does not yield silicon metal of the required purity until it has been cleaned. The process of cleaning a furnace reportedly takes about a month, and thus the attendant loss of production and shutdown and startup costs are high.

U.S. tariff treatment

Imported silicon metal is classified for tariff purposes under items 632.42 and 632.84 of the Tariff Schedules of the United States (TSUS). The following tabulation shows the current most-favored-nation rates of duty (which are applicable to imports from Canada) and the statutory rates of duty:

TSUSA item no.	Description	Most-favored-nation rate 1/	Statutory rate
632.4200	Silicon metal, unwrought, containing by weight not over 99.7% of silicon.	2¢ per lb on silicon content 2/	8¢ per lb on silicon content
632.8420	Other alloys, unwrought, containing by weight 96.0% or more but less than 99.0% of silicon.	9% ad val.	45% ad val.

1/ These rates have been in effect since Jan. 1, 1972.
2/ During 1977 and 1978 this was equivalent to an ad valorem rate of duty of 5.1 percent.

Imports of silicon metal under TSUS item 632.42 from designated beneficiary developing countries are eligible for duty-free treatment under the Generalized System of Preferences (GSP); Canada is not eligible for such treatment. Imports under item 632.8420 are not eligible for GSP treatment.

U.S. Producers

Six firms produced silicon metal at eight establishments in the United States during 1978. These firms and their plant locations are as follows (also see fig. 1 on the following page):

Firm	Plant location
Hanna Mining Co	Wenatchee, Wash.
Interlake, Inc	Beverly, Ohio
Do	Selma, Ala.
Kawecki Berylco Industries, Inc	Springfield, Oreg.
Ohio Ferro-Alloys Corp	Powhatan, Ohio
Do	Montgomery, Ala.
Reynolds Metals Co	Sheffield, Ala.
Union Carbide Corp	Alloy, W. Va.

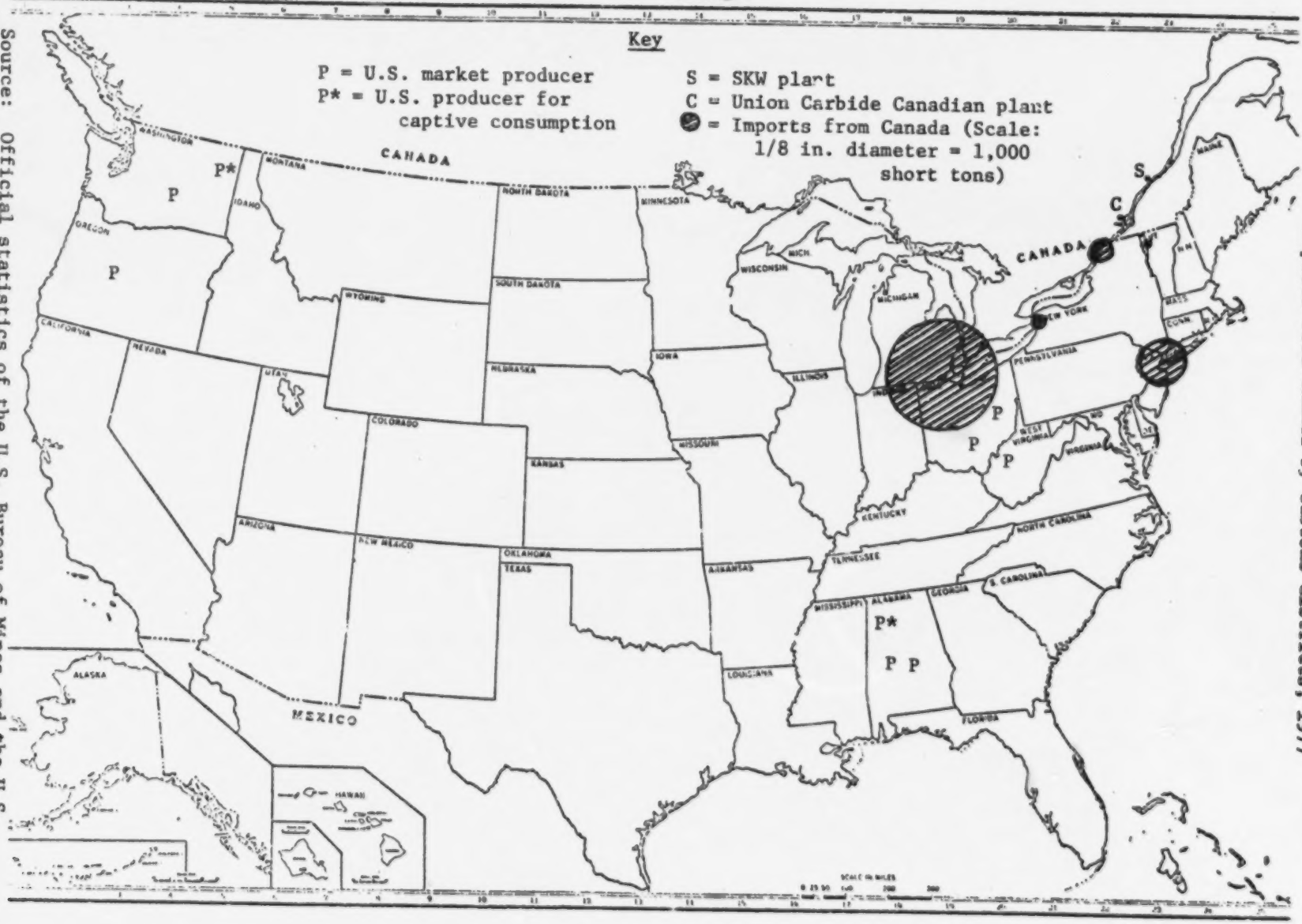

Figure 1.--Silicon metal: U.S. and Canadian producing establishments, and imports from Canada by customs districts, 1977

Source: Official statistics of the U.S. Bureau of Mines and the U.S. Department of Commerce.

All of the six firms shown above produced silicon metal throughout 1974-78. A seventh firm--Northwest Alloys, Inc., a subsidiary of the Aluminum Co. of America (Alcoa)-- * * * * * *

Ohio Ferro-Alloys Corp. produced both silicon metal and ferrosilicon at an establishment in Brilliant, Ohio, until mid-1976. With the commencement in that year of production of silicon metal at its new facility in Alabama, the firm discontinued the production of silicon metal at the Brilliant plant. The Brilliant plant continued to produce ferrosilicon until November 1977, at which time it was closed permanently. According to the firm's 1977 annual report, the decision to close the facility "reflects its loss of viability caused by the combination of an aging plant, increasing competition from foreign imports and escalating coal and power costs."

Union Carbide Corp. also produces silicon metal in Canada and Norway. Its production in Canada is primarily for consumption in that country, while its production in Norway is for export to countries other than the United States. The firm reported that, because of the shutdown in 1974 of certain of its U.S. facilities for installation of pollution abatement equipment, silicon metal from both countries was exported to the United States in that year in order to supplement its domestic production. Union Carbide reported that it has not exported silicon metal from either country to the United States since 1974.

The importance of silicon metal in the overall operations of the six domestic producers varies widely. Most also produce ferrosilicon, but either at other establishments or with furnaces not also used for producing silicon metal. One firm--the Reynolds Metals Co.--is a major aluminum producer, and its output of silicon metal is predominantly used captively. Sales of silicon metal by the five market producers, expressed as a share of each firm's total sales in 1977, ranged from less than * * * percent for * * * to * * * percent for * * *, as shown in the following table.

Silicon metal: U.S. market producers' total sales and sales of silicon metal, 1977

Firm	Total sales	Market sales of silicon metal	
		Value	Share of total sales
	Million dollars	Million dollars	Percent
Union Carbide Corp------	7,036	***	***
Interlake, Inc----------	767	***	***
Hanna Mining Co---------	331	***	***
Kawecki Berylco---------	132	***	***
Ohio Ferro-Alloys-------	101	***	***

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Canadian Producers

There are two producers of silicon metal in Canada--Union Carbide Canada, Ltd., and SKW Electro-Metallurgy Canada, Ltd. (SKW). The former produces silicon metal and ferrosilicon at Beauharnois, Quebec; its plant at Chicoutimi, Quebec, produces only ferrosilicon. * * * Union Carbide's capacity to produce silicon metal in Canada is estimated by the U.S. Bureau of Mines to be 10,000 short tons per year.

SKW Electro-Metallurgy Canada, Ltd.--a subsidiary of SKW-Trostbery, West Germany (85 percent) and A/S Ila og Lilleby Smelteverker of Norway (15 percent)--began producing both silicon metal and ferrosilicon in July 1976 at Becancour, Quebec (fig. 1). * * *

Nature and Extent of LTFV Sales

The Treasury Department's investigation of U.S. imports of silicon metal from Canada covered the 6-month period September 1, 1977, through February 28, 1978. Treasury found that virtually all imports of the subject merchandise from Canada during that period were manufactured by SKW and, therefore, limited its investigation to sales by this firm. Fair-value comparisons were made on virtually all silicon metal sold by SKW in the United States--about * * * short tons--during the period of investigation. A comparison of purchase prices to U.S. customers with home-market prices of such or similar merchandise resulted in LTFV margins ranging from 0.4 percent to 18.3 percent on 44 percent of the sales compared; the weighted average margin on all sales compared was 2.7 percent. 1/ The petitioners maintained that prices of silicon metal in the home market (Canada) should have been disregarded because they were less than the cost of producing the merchandise. Treasury investigated this claim and found that in every instance SKW's cost of production was less than the price charged home-market purchasers of silicon metal.

Sales to the United States accounted for * * * percent of SKW's total sales of silicon metal in 1977 and * * * percent in 1978. The firm's production and sales in 1977 and 1978 are shown in the following table.

* * * * * * *

According to information contained in the file obtained from Treasury,

* * * * * * *

1/ Based on the Commission's method of calculating LTFV margins (home-market price minus purchase price, divided by home-market price), the above margins ranged from 0.4 percent to 15.5 percent, with a weighted average of 2.6 percent. The weighted average margin on all sales found to have been sold at LTFV was * * * percent (Treasury's method).

U.S. Consumption

Apparent U.S. consumption of silicon metal is shown in table 1, appendix C, and the following figure (fig. 2). Such consumption rose from 96,000 short tons in 1968 to 137,600 tons in 1974, before dropping by one-third in 1975 to 92,400 tons. Consumption has increased since 1975 and amounted to 158,500 tons in 1978, an alltime high and 13 percent more than consumption in 1977. Apparent consumption rose at an average annual (trend) rate of 5.1 percent during 1968-78. The demand for silicon materials (including ferrosilicon) is expected by the Bureau of Mines to increase at an average rate of 3 percent annually through 1985. 1/

As indicated previously, silicon metal is used predominantly by the nonferrous metals and chemical industries. During recent years about 95 percent of the silicon metal consumed domestically was used in producing aluminum alloys and silicones (table 2). The remainder was about equally divided between uses in producing iron and steel and miscellaneous uses such as the manufacture of high-purity silicon metal for electronic applications. Although consumption of silicon metal in producing silicones increased relative to other uses during 1973-77, consumption in aluminum alloy production remained the largest end use, accounting for 54 percent of aggregate consumption in 1977. Silicon metal is used in both primary and secondary (i.e., that utilizing scrap) production of aluminum. The high degree of correlation between consumption of silicon metal and production of aluminum is illustrated graphically in figure 3.

During the Commission's hearing and in their brief, the four domestic producers represented stressed that the impact of LTFV sales of silicon metal has been felt most keenly in the secondary aluminum market. They noted that, because of the greater number of purchasing firms and the greater degree of price competition existing in that market, imports have achieved a higher degree of penetration than in other domestic markets for silicon metal. It was alleged that the combination of lower volume sales, fewer firms, and relatively less stress placed on price vis-a-vis such factors as quality and reliability of supply have acted to make it more difficult for imported silicon metal to penetrate the primary aluminum and silicone markets.

About 60 firms in the United States operate secondary aluminum smelters. Twelve companies operated 31 primary aluminum reduction plants in 1977; one of these firms--the Reynolds Metals Co.--is a domestic producer of silicon metal. Four domestic firms produce silicone from silicon metal; one--Union Carbide Corp.--also produces silicon metal.

U.S. Imports

U.S. imports of silicon metal dropped sharply between 1974 and 1975--from 19,000 tons to 6,900 tons (table 3). After partially recovering in 1976 to 9,400 tons, imports climbed to 26,100 tons in 1977. Imports continued to rise

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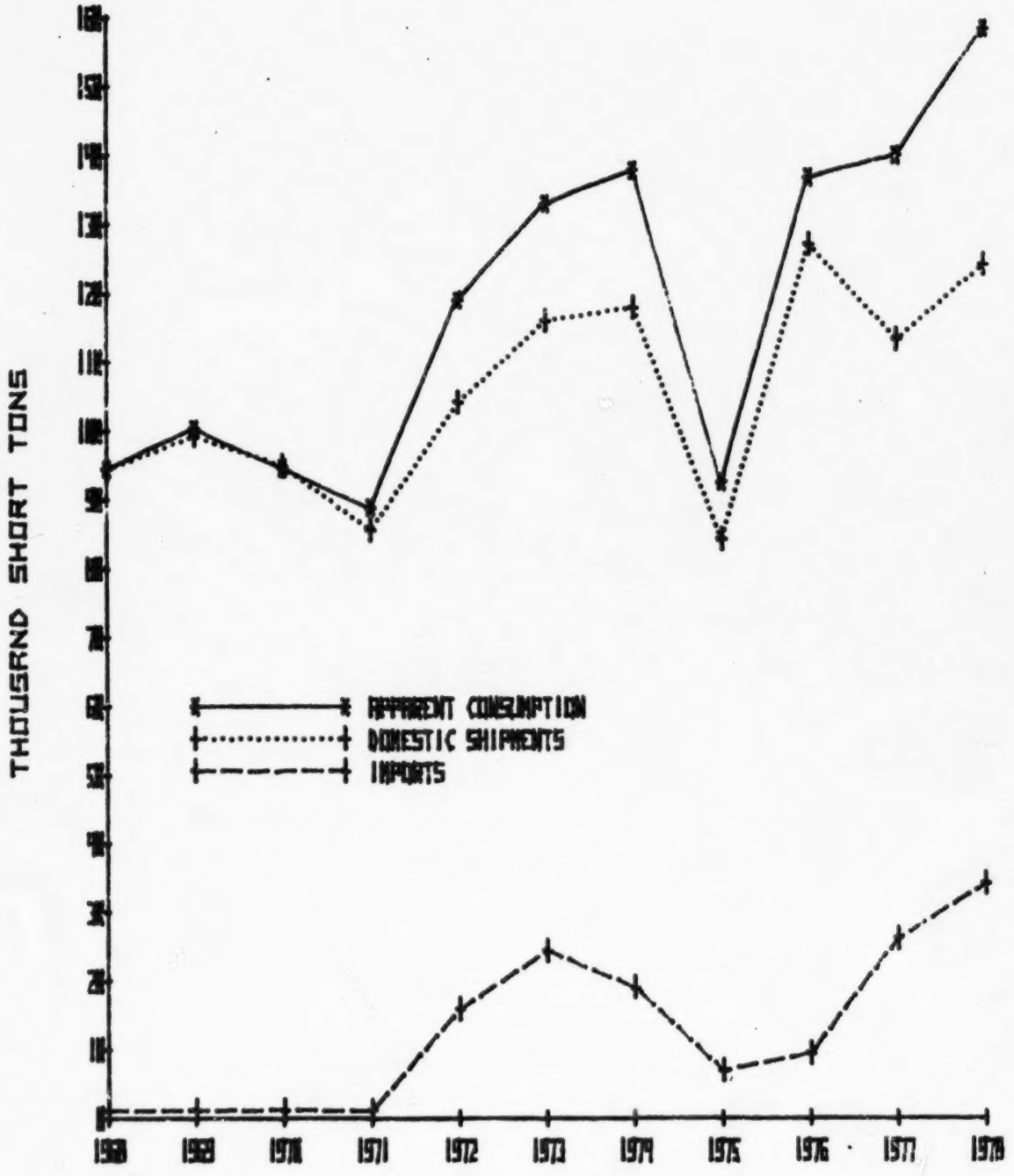
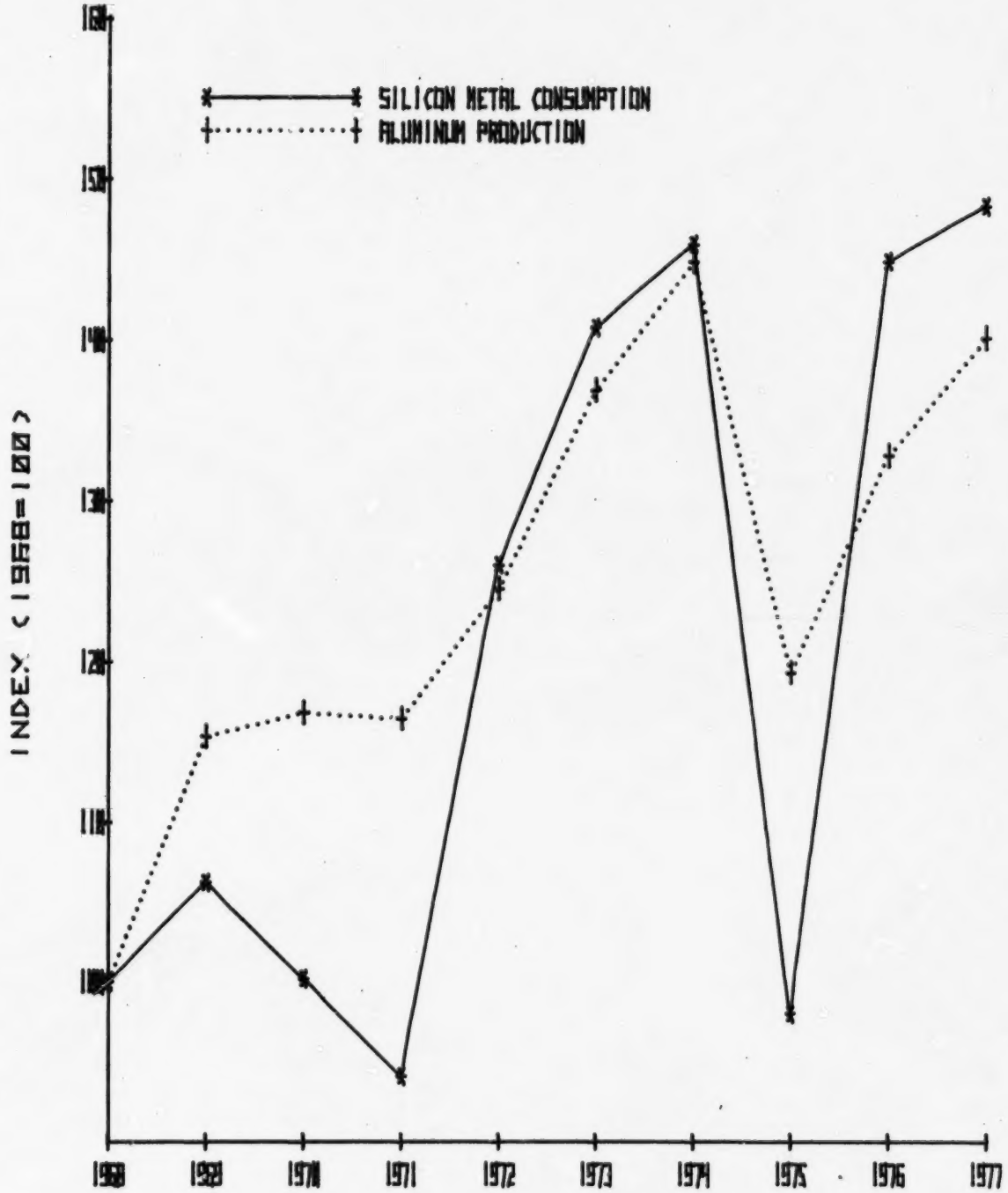
1/ U.S. Bureau of Mines, Mineral Commodity Summaries, 1978, p. 153.

FIGURE 2.--SILICON METAL: APPARENT U.S. CONSUMPTION, DOMESTIC SHIPMENTS, AND IMPORTS, 1968-78



Source: Compiled from official statistics of the U.S. Department of Commerce and the U.S. Bureau of Mines, and from data submitted in response to questionnaires of the U.S. International Trade Commission.

FIGURE 3.--INDEXES OF U.S. CONSUMPTION OF SILICON METAL AND PRODUCTION OF ALUMINUM, 1968-77



SOURCE: COMPILED FROM OFFICIAL STATISTICS OF THE U.S. BUREAU OF MINES.

in 1978--reaching 34,500 tons, or almost one-third more than in 1977. Four countries--Canada, Norway, the Republic of South Africa, and Yugoslavia--accounted for about nine-tenths of total imports in 1977 and 1978.

As shown in figure 2 (page A-10), U.S. imports of silicon metal have been substantially greater since 1971 than during previous years. Increased imports during 1972-74 were largely due to the increased level of domestic demand for silicon metal during those years, the straining of domestic capacity to satisfy that demand, and an expansion of foreign capacity. The sharp drop in domestic consumption in 1975 was accompanied by an even sharper relative decrease in imports. Similarly, the increase in imports in 1976 (36 percent) was less than the relative increase in apparent domestic consumption (48 percent) in that year. In contrast, however, imports in 1977 were more than double those in 1976, while consumption increased by only 2 percent. The growth of imports in 1978 again outstripped the growth of apparent consumption; the former rose by 32 percent, while consumption increased 13 percent.

Canada's role as a supplier of silicon metal to the United States has undergone a dramatic shift in the past 2 years, as illustrated in figure 4. That country was a relatively minor source of silicon metal imports until the latter part of 1976, when SKW commenced production at its new plant, but since that time it has been the largest source of imports (table 4). For example, imports of silicon metal from Canada jumped from 540 tons in 1976, or 6 percent of total imports, to almost 11,000 tons in 1977--equivalent to 42 percent of the total. However, in contrast to the one-third increase in aggregate U.S. imports of silicon metal in 1978 over those in 1977, imports from Canada declined by 5 percent. 1/ Canada remained as the largest supplier of silicon metal to the United States during 1978, but its share of the total fell to 30 percent.

U.S. imports of silicon metal in 1977, by specified sources and by customs districts, are shown in table 5. Seventy percent of total imports in that year entered through three districts--New York City, Detroit, and Chicago. All imports from Canada were entered through customs districts in the northeastern quadrant of the United States; over four-fifths of such imports entered through Detroit and New York City (fig. 1).

Consideration of Injury or Likelihood Thereof

U.S. production and capacity utilization

Annual U.S. production of silicon metal fluctuated widely during 1974-78--

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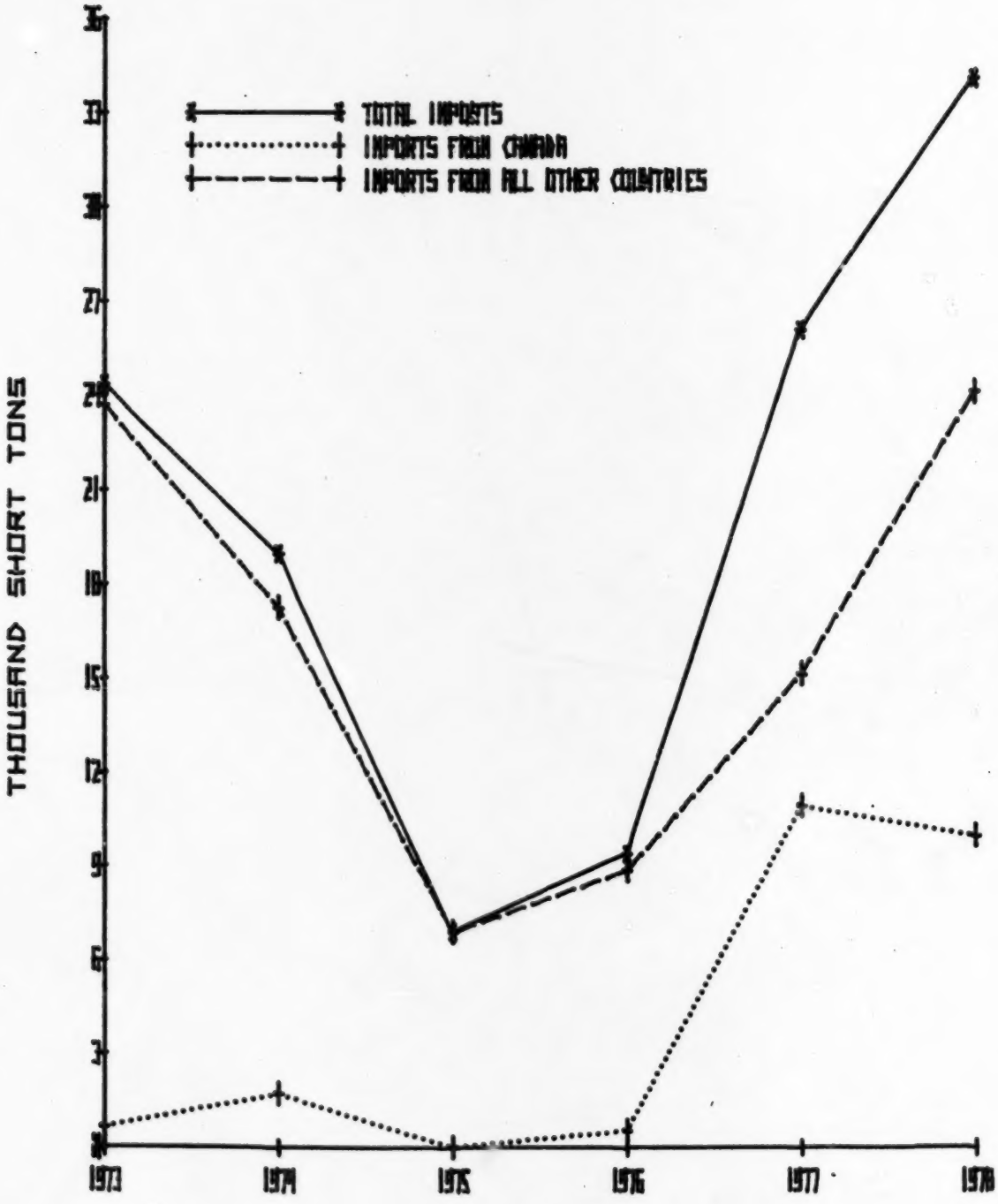
1/ Contrary to the decline shown by official U.S. statistics in imports for consumption of silicon metal from Canada in 1978, data submitted to the Commission by SKW show that the firm's sales to the United States in 1978 were * * * percent greater in quantity than such sales in 1977 (see table on page A-8). This discrepancy is probably largely a matter of timing, since SKW's data represent sales, not shipments. The increased sales reported by SKW will probably be reflected in U.S. import statistics for early 1979.

FIGURE 4.--SILICON METAL: U.S. IMPORTS, TOTAL AND FROM CANADA, 1973-78.



SOURCE: COMPILED FROM OFFICIAL STATISTICS OF THE U.S. DEPARTMENT OF COMMERCE.

dropping by more than one-fourth in 1975, recovering in 1976 to an alltime high, falling again by about 12 percent in 1977, and slipping an additional 4 percent in 1978 (fig. 5). Although production evidenced no clear trend during the period, domestic capacity to produce silicon metal expanded without interruption, as shown in the following tabulation:

Item	1974	1975	1976	1977	1978
Production-------short tons---	132,492	95,200	138,829	122,658	118,146
Capacity---------------do-----	138,866	166,223	206,973	211,473	217,973
Capacity utilization percent---	95.4	57.3	67.1	58.0	54.2

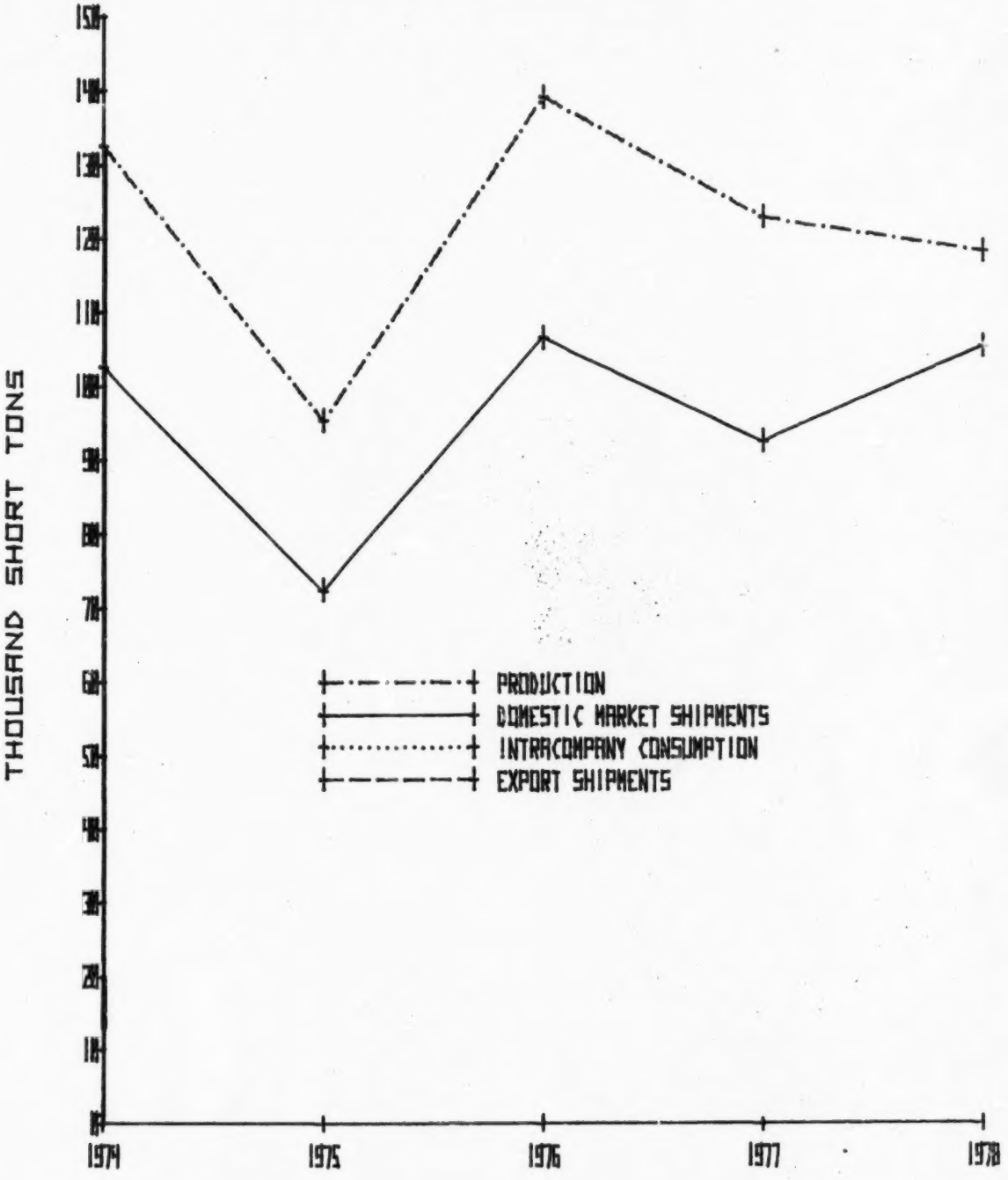
During 1973 and 1974, years of high demand and rising prices for silicon metal in the United States and abroad, several U.S. producers made capital commitments to expand productive capacity with the addition of new facilities and the replacement of obsolete furnaces with more efficient and environmentally cleaner units. However, most of the additions to domestic capacity did not come on stream until late 1975 and early 1976. Expansion of domestic capacity has slowed appreciably in the last 2 years.

As indicated above, domestic producers operated at close to maximum practical capacity in 1974. In 1975, the combination of a 20-percent increase in capacity and a 28-percent drop in production lowered the capacity utilization rate to 57 percent. Capacity utilization rose to only 67 percent in 1976, despite the fact that production peaked in that year, because of an additional 25-percent growth in capacity. The capacity utilization rate has again fallen since 1976 because of declining production in the face of continuing--albeit relatively minor--increases in capacity.

U.S. producers' shipments and intracompany transfers

U.S. producers' domestic shipments, exports, and intracompany transfers (i.e., captive consumption) of silicon metal during 1974-78 are shown in the following table and in figure 5.

FIGURE 5.--SILICON METAL: U.S. PRODUCTION, SHIPMENTS, AND INTRACOMPANY CONSUMPTION, 1974-78



SOURCE: COMPILED FROM DATA SUBMITTED IN RESPONSE TO QUESTIONNAIRES OF THE U.S. INTERNATIONAL TRADE COMMISSION.

Silicon metal: U.S. producers' shipments and intracompany transfers, 1974-78

Item	1974	1975	1976	1977	1978
	Quantity (short tons)				
Domestic shipments	102,581	72,319	106,345	92,456	105,227
Export shipments	***	***	***	***	***
Intracompany transfers	***	***	***	***	***
Total	118,711	88,689	128,606	114,122	128,607
	Value (1,000 dollars)				
Domestic shipments	78,884	63,796	91,172	81,005	91,934
Export shipments	***	***	***	***	***
Intracompany transfers	***	***	***	***	***
Total	92,720	78,228	110,539	100,307	112,180

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Two producers--the Reynolds Metals Co. and Union Carbide Corp.--predominantly account for intracompany transfers of silicon metal. Reynolds consumes the vast bulk of its production of silicon metal in its aluminum operations, while Union Carbide uses a substantial portion of its output in the production of silicones. The increase in intracompany transfers of silicon metal since 1975--such transfers averaged * * * tons in 1976-78, as compared with * * * tons in 1974 and 1975--is chiefly due to the * * * * *

Figure 5 shows that fluctuations in U.S. producers' domestic market shipments during 1974-77 paralleled changes in production. Both dropped sharply in 1975, recovered in 1976 to a level greater than in 1974, and then slumped again in 1977. In 1978, however, shipments rose while production continued to decline. Trends in the value of producers' shipments and intracompany transfers were the same as trends in terms of quantity. The average unit value of shipments and transfers rose from 39 cents per pound in 1974 to 44 cents per pound in 1975, and then remained virtually unchanged during 1976-78.

Counsel for the domestic producers maintained at the Commission's hearing and in their brief that the secondary aluminum market has been the focus of the alleged injury caused by LTFV sales of silicon metal from Canada. The following table shows that U.S. producers' shipments of silicon metal to secondary aluminum producers did indeed fall in 1977, both in absolute terms and relative to shipments to other classes of customers. In 1978, however, shipments to secondary aluminum producers rose to the second highest level during 1974-78. Some 47 percent of silicon metal producers' domestic shipments in 1978 went to secondary aluminum producers, a share only slightly less than that during 1974-76.

Silicon metal: U.S. producers' domestic shipments, by types of customers, 1974-78

Type of customer	1974	1975	1976	1977	1978
	Quantity (short tons)				
Aluminum producers:					
Primary	17,590	8,458	14,332	13,533	14,250
Secondary	49,557	36,455	52,408	37,745	49,635
Chemical producers	28,608	22,597	33,119	34,665	34,203
All other	6,826	4,809	6,486	6,513	7,139
Total	102,581	72,319	106,345	92,456	105,227
	Relative share (percent)				
Aluminum producers:					
Primary	17.1	11.7	13.5	14.6	13.5
Secondary	48.3	50.4	49.3	40.8	47.2
Chemical producers	27.9	31.2	31.1	37.5	32.5
All other	6.7	6.7	6.1	7.1	6.8
Total	100.0	100.0	100.0	100.0	100.0

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Inventories

Yearend stocks of silicon metal reported by domestic producers to the Commission and by consumers to the Bureau of Mines are shown in the following tabulation (in short tons):

	Producers' stocks	Consumers' stocks
Dec. 31--		
1973	2,810	13,061
1974	6,871	12,021
1975	12,131	10,616
1976	15,693	10,147
1977	16,285	9,427
1978	5,325	1/

1/ Not available.

Producers and consumers reported sharply divergent trends in stocks of silicon metal during 1973-77. Inventories held by producers more than quintupled, while those reported by consumers declined by one-fourth. The net effect was an increase in combined stocks from 16,000 tons at yearend 1973 to 26,000 tons at the close of 1977. Producers sharply reduced their inventories of silicon metal during 1978, however, and by the end of the year such stocks were at the lowest level since 1973.

U.S. producers' yearend inventories, expressed as a percentage of average annual domestic production of silicon metal during 1974-78, rose from less than 3 percent in 1973 to 13 percent in 1977. While it is difficult to discern what is "normal" for the industry, it would appear that while producers' stocks in 1973 were less than adequate in light of the subsequent high demand in 1974, those by the end of 1977 were clearly larger than optimal. The working off of these "excessive" inventories during 1978 is reflected in that year's 4 percent decrease in domestic production in the face of a 13 percent increase in producers' shipments plus intracompany transfers. The latter exceeded production in 1978 by 10,500 tons, almost the same as the decrease in producers' stocks in that year.

Employment

Data on average employment and man-hours worked in domestic establishments in which silicon metal was produced during 1974-78 are shown in the following table.

Average number of employees and man-hours worked by production and related workers in establishments in which silicon metal was produced, 1974-78

Item	1974	1975	1976	1977	1978
	Average number of employees				
All persons	3,980	3,508	3,634	3,665	3,721
Production and related workers engaged in the production of--					
All products	3,124	2,647	2,746	2,837	2,821
Silicon metal	1,208	972	1,102	971	755
	Man-hours worked (thousands)				
Production and related workers engaged in the production of--					
All products	6,027	5,025	5,586	5,678	5,803
Silicon metal	2,240	1,810	2,181	1,787	1,470

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

The average number of production and related workers engaged in operations on silicon metal, and the number of man-hours worked by such employees, fell by almost one-third from 1976 to 1978. Domestic production of silicon metal also decreased between those 2 years, but the percentage decline was less than half that in employment and man-hours worked. As indicated earlier, domestic producers have substantially increased their capacity to produce silicon metal in recent

years with the addition of a new plant and the modernization and expansion of various other facilities. One apparent effect of these changes in productive facilities, most of which occurred during 1974-76, is a sharp increase in worker productivity since 1975. The following tabulation shows pounds of silicon metal produced per man-hour worked by production and related employees:

	Productivity
1974	118
1975	105
1976	127
1977	137
1978	161

The impact of increased productivity on employment in producing silicon metal can be illustrated by comparing data for 1975 and 1977. The average number of production and related workers employed in silicon metal operations was almost identical--972 in 1975 and 971 in 1977. Nevertheless, domestic production of silicon metal in the latter year was 29 percent greater than in 1975. If worker productivity in 1977 had been the same as the average in 1974-76 (118 pounds per man-hour), output in that year would have required an additional input of 297,600 man-hours--roughly equivalent to the employment of 150 more production workers.

In the past 2 years the U.S. Department of Labor has concluded three investigations in response to petitions from workers engaged in producing silicon metal for certification of eligibility to apply for adjustment assistance under chapter 2 of the Trade Act 1f 1974. In two of these cases Labor certified the workers eligible; the petition was denied in the other case. A summary of the three investigations is shown in the following tabulation:

Name and location of establishment	Estimated number of workers	Date investigation instituted	Determination		Date of impact
			Date	Decision	
Ohio Ferro-Alloys, Powhatan Point, Ohio.	30	2/24/77	6/29/77	Denied	-
Ohio Ferro-Alloys, Powhatan Point, Ohio.	245	8/17/77	1/18/78	Certified	11/7/76
Union Carbide Corp., Alloy, W. Va.	350	1/3/78	9/21/78	Partially certified 1/	12/21/76

1/ Workers at this facility produced several products; those engaged in employment related to the production of silicon metal were certified.

Profit-and-loss experience

U.S. market producers' net income from operations on silicon metal dropped sharply from 1974 to 1977, but recovered somewhat during January-September 1978 (table 6). Corresponding with a 20-percent decline in net sales and intra-company transfers of silicon metal, net operating income fell from $19.5 million in 1974 to $4.8 million in 1975. Despite a recovery in sales in 1976 to a level greater than that reached in 1974, operating income from silicon metal operations continued to decline--to $2.2 million. Both sales and operating income slipped in 1977, the latter to a loss of $1.4 million. A net operating profit of $1 million was recorded during January-September 1978, as shown below:

Item	1974	1975	1976	1977	Jan.-Sept. 1978
Net sales and transfers					
1,000 dollars	87,449	69,827	97,469	88,994	69,248
Net operating profit or (loss)					
1,000 dollars	19,549	4,758	2,208	(1,444)	1,054
Ratio of net operating profit or (loss) to net sales and transfers					
percent	22.4	6.8	2.3	(1.6)	1.5

All five domestic market producers reported profits on their operations on silicon metal in 1974, three in 1975, four in 1976, three in 1977, and two in January-September 1978. One firm-- * * * --operated profitably throughout the entire period, while another-- * * * --reported profits only in 1974. In comparison with the financial performance of most U.S. manufacturing firms and firms in the nonferrous metals industry, silicon metal producers fared much better in 1974, about the same in 1975, and considerably worse in 1976, 1977, and the first three quarters of 1978, as shown in the table on the following page.

Ratios of net profit or (loss) before income taxes to net sales for domestic producers on their operations producing silicon metal, for all manufacturing corporations, and for producers of nonferrous metals, 1974-77 and January-September 1978

Industry and firm	1974	1975	1976	1977	Jan.-Sept. 1978
Silicon metal:					
Union Carbide Corp	***	***	***	***	***
Interlake, Inc	***	***	***	***	***
Hanna Mining Co	***	***	***	***	***
Kawecki Berylco	***	***	***	***	***
Ohio Ferro-Alloys	***	***	***	***	***
Weighted average	21.0	5.9	1.9	(2.0)	1.2
All manufacturing	8.7	7.5	8.7	8.7	1/ 8.8
Nonferrous metals	10.6	4.1	5.3	4.8	1/ 6.1

1/ January-June 1978.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission and from the Federal Trade Commission, Quarterly Financial Report for Manufacturing, Mining and Trade Corporations.

The erosion in profits realized by domestic silicon metal producers since 1975, despite a recovery in sales to levels comparable with that in 1974, reflects the impact of increasing unit production costs during a period in which prices remained relatively constant. Data submitted by three petitioners following the public hearing show the following average unit cost increases between 1975 and 1978: Raw materials--21 percent, labor--44 percent, power--28 percent, and electrodes--49 percent. During the same time, the average unit value of producers' shipments of silicon metal remained virtually unchanged at 44 cents per pound. The impact of increasing production costs on profits in silicon metal operations can be seen in the following ratios of cost of goods sold to net sales and transfers:

	Percent
1974	73
1975	85
1976	91
1977	95
1978 (Jan.-Sept.)	93

Domestic producers' capital expenditures in connection with their operations on silicon metal peaked in 1975 and declined significantly in 1977 and 1978. A large part of such expenditures in 1974-76 were made in connection with the Ohio Ferro-Alloy Corp.'s new facility in Alabama. Thirty five percent, or $25 million,

of aggregate capital expenditures made during 1974-78 resulted from efforts to comply with environmental and safety regulations. Research and development expenses incident to the production of silicon metal were small, averaging about * * * percent of annual sales. Only one firm-- * * * --reported such expenditures.

Silicon metal: Capital expenditures and research and development expenses incurred by U.S. producers, 1974-78

(In thousands of dollars)

Item	1974	1975	1976	1977	1978
Capital expenditures:					
Land and land improvements	***	***	***	***	***
Building or leasehold improvements	***	***	***	***	***
Machinery, equipment, and fixtures	16,180	31,239	17,131	1,970	1,174
Total	16,707	34,807	17,687	2,079	1,391
Above expenditures made to comply with environmental and safety regulations	***	***	***	***	***
Research and development expenses	***	***	***	***	***

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Consideration of the Causal Relationship Between LTFV Imports From Canada and the Alleged Injury

Market penetration of LTFV imports

As noted earlier, Canada was a relatively minor supplier of silicon metal to the United States prior to 1977. During 1973-76, for example, imports from Canada accounted for 1 percent or less of apparent annual domestic consumption. In 1977, imports from Canada rose very sharply to almost 11,000 tons--equivalent to 7.8 percent of apparent domestic consumption of silicon metal in that year. Official statistics of the U.S. Department of Commerce show that, although total U.S. imports of silicon metal in 1978 were 32 percent greater than those in 1977, imports from Canada were 5 percent less. 1/ Imports from Canada in 1978 were equivalent to about 6.6 percent of apparent domestic consumption of silicon metal. As shown in table 1, the ratio of imports from all sources to apparent consumption rose from 18.6 percent in 1977 to 21.7 percent in 1978.

1/ See footnote 1 on page A-12.

All imports from Canada were not found to have been sold at LTFV. SKW--the only Canadian producer of silicon metal for export to the United States and the only firm found by Treasury to have made sales at LTFV--did not begin production until mid-1976. Moreover, Treasury found that during the period of its investigation--September 1, 1977, through February 28, 1978--only 44 percent of SKW's sales were at LTFV. If it is assumed that the same percentage of total U.S. imports of silicon metal from Canada in 1977 and 1978 were sold at LTFV, such LTFV imports were equal to 3.4 percent and 2.9 percent of apparent domestic consumption in those years, respectively.

Lost sales

All domestic producers of silicon metal were requested to provide the Commission with evidence of sales lost, if any, to imports from Canada since July 1, 1976. The two predominantly captive producers (Northwest Alloys, Inc., and Reynolds Metals Co.), plus * * * * and * * * had no direct evidence of silicon metal sales lost to imports from Canada. Details of the information reported by the other three domestic market producers are as follows.

* * * * * * *

In total, the 3 producers listed 26 firms (excluding duplications) whose purchases of domestically made silicon metal had declined because of imports from Canada. The file obtained from Treasury contains information on specific purchases by 16 of these firms of silicon metal from Canada during the period of Treasury's investigation.

* * * * * * *

In an effort to verify the information reported by domestic producers concerning lost sales, the Commission contacted 20 firms alleged to have reduced purchases of U.S.-made silicon metal in 1977 and 1978 because of imports from Canada. Three of the customers contacted reported reduced purchases of domestically made silicon metal in those years. One of the three purchased silicon metal from Canada during the period in which Treasury conducted its investigation; sales to this purchaser totaled * * * tons, all of which were found by Treasury to have been sold at LTFV. A second firm purchased silicon metal from Canada through an intermediary, all of whose purchases from Canada were found by Treasury to have been made at fair value. The remaining firm did not purchase silicon metal from Canada during the period in which Treasury found sales at LTFV.

The three firms reporting reduced purchases of domestically produced silicon metal advised the Commission that price differentials between the Canadian and U.S. products ranged from 1/2 cent per pound to 2 cents per pound, and that such differentials were sufficient for them to change sourcing patterns. The remaining firms contacted by the Commission reported that, for the most part, increased

consumption of silicon metal was supplied by imports or that Canadian imports displaced imports from other countries.

Prices

U.S. producers.--At the Commission's hearing and in their brief, the four domestic producers represented stressed that price as a competitive factor varies in importance with the user, or industry, to which each respective grade of silicon metal is sold. The three grades of silicon metal for which price data were gathered by the Commission's questionnaires were--

(1) 98 percent minimum silicon content; 0.5 percent maximum iron content. The primary aluminum industry usually purchases this grade, paying a premium for the low iron content.

(2) 98 percent minimum silicon content; 1 percent maximum iron content. The secondary aluminum industry normally uses this grade. Since the quality specifications for this grade are less demanding, price weighs more heavily in selling the material. The brief presented by the domestic silicon metal producers emphasizes that the purchases of the secondary aluminum industry are "essentially price dictated" and states that "price is the critical determinant of silicon metal sales to this industry."

(3) 98 percent minimum silicon content; 1 percent maximum iron content; 0.5 percent maximum aluminum content. The silicone chemical industry requires a product with a relatively low aluminum content. In selecting a source of supply, purchasers have advised that they generally regard price as a secondary consideration, after determining which producers can meet the quality and delivery requirements.

Quarterly price data for 1976-78 compiled from the questionnaires returned by domestic producers are shown in table 7. The five companies from which information was obtained account for virtually all market sales of domestically produced silicon metal. The prices shown are based upon sales made by each producer to its largest customer (excluding, if applicable, any intracompany sales for captive use). Producers were asked to state the realized prices net of all discounts and allowances, f.o.b. their point of shipment. 1/

U.S. producers' prices for silicon metal remained stable in 1976. For example, the quarterly weighted average prices of the grade containing a minimum of 98 percent silicon and a maximum of 1 percent iron were in the vicinity of 42.2 cents per pound throughout the year. It was not until early 1977 that increases amounting to approximately 3 cents per pound (7 percent) took place, with the rise attributed primarily to the need to offset the cumulative squeeze

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1/ Silicon metal prices are normally quoted in cents per pound of contained silicon. Prices are quoted for lump bulk (40,000 pounds or more) and carload lots, f.o.b. shipping point, freight equalized to the nearest producer. U.S. producers' list prices for various grades of silicon metal, which are published on a regular basis in Metals Week, are shown in table 8.

on profits as costs rose. In July 1977, domestic producers rescinded their earlier price increases and, as table 7 indicates, made further small reductions in October-December 1977 and early 1978. The result was a weighted average price per pound of 41.79 cents for the period January-March 1978. Following an apparent increase in demand in early 1978, prices were again increased in May and continued to move upward throughout the year. The weighted average price of 44.95 cents per pound for October-December 1978 was the highest for the 3-year period 1976-78.

* * * * * * --the data presented in table 7 raise two questions in particular about domestic producers' pricing policies.

One question is why U.S. producers cut the prices of all three grades by a comparable amount, since imports at LTFV allegedly affected primarily their sales to the secondary aluminum industry. Changes in the weighted average prices during July-September 1977 indicate that reductions in the range of 2 to 3 cents per pound were made across the board, and further cuts in the prices of all three grades were made in October-December of that year. Thus, this evidence suggests that competition from the Canadian or other imports--or other supply or demand factors--was exerting downward pressure on prices throughout the industry.

A second, although related, question concerns the range in prices reported by domestic producers in their sales of silicon metal to the secondary aluminum industry. Such prices differ, in a given quarter, by as little as 0.75 cent per pound (April-June 1976 and October-December 1978) and by as much as 4.65 cents per pound (April-June 1978). During the period July 1977 to May 1978 when, as producers alleged in replying to the questionnaires, they were forced to cut prices to meet competition from the LTFV sales, the range of prices narrowed. For example, the range was 1.64 cents per pound in October-December 1977 and 1 cent per pound In January-March 1978. During the same period, however, a comparable range of prices is shown for sales of the silicone (chemical) grade. The range was 0.5 cent per pound in October-December 1977 and 1.01 cents during January-March 1978.

Comparison of domestic and import prices.--During the Commission's hearing there was general agreement by the parties concerned that, at least during the period of Treasury's investigation, SKW's silicon metal prices in the United States were about 3 cents per pound less than the domestic producers' list prices for comparable grades of the product. Information obtained from various sources (e.g., questionnaires returned by importers and consumers, the hearing, briefs, the file obtained from Treasury) confirms this general margin of underselling. For example, information in the Treasury file shows that during September 1977-February 1978 silicon metal sold by SKW * * * * * * * * The vast bulk of such sales were made to secondary aluminum producers, which normally purchase the grade having a minimum silicon content of 98 percent and a maximum iron content of 1 percent. In comparison, the domestic producers' list price for this grade at that time was 42.5 cents per pound (table 8). As shown in table 7, the weighted average price received by domestic producers for this grade was 42.01 cents per pound during October-December 1977 and 41.79 cents per pound during January-March 1978.

Data compiled from the transactions listed by two U.S. purchasers and shown in tables 9 and 10 are illustrative.

* * * * * * *

APPENDIX A

TREASURY DEPARTMENT'S LETTER TO THE COMMISSION ADVISING OF ITS DETERMINATION OF LTFV SALES FROM CANADA

THE GENERAL COUNSEL OF THE TREASURY
WASHINGTON, D.C. 20220

NOV 30 1978

NUMBER
TE 5-19
Office of the Secretary

Dear Mr. Chairman:

In accordance with section 201(a) of the Antidumping Act, 1921, as amended, you are hereby advised that silicon metal from Canada is being, or is likely to be, sold at less than fair value within the meaning of the Act.

For purposes of Treasury's investigation, the subject merchandise is silicon metal, unwrought, containing by weight not over 99.7 percent pure silicon; and alloys of silicon metal, unwrought, containing by weight 96 percent or more but less than 99.0 percent silicon.

The U.S. Customs Service is making the files relative to this determination available to the International Trade Commission under separate cover. These files are for the Commission's use in connection with its investigation as to whether an industry in the United States is being, or is likely to be, injured, or is prevented from being established, by reason of the importation of this merchandise into the United States. Since some of the data in these files is regarded by the Treasury to be of a confidential nature, it is requested that the Commission consider all information therein contained for the use of the Commission only, and not to be disclosed to others without prior clearance with the Treasury Department.

Sincerely yours,

Robert H. Mundheim

The Honorable
Joseph O. Parker, Chairman
U.S. International Trade
Commission
Washington, D.C. 20436

Enclosures

APPENDIX B

U.S. INTERNATIONAL TRADE COMMISSION NOTICE
OF INVESTIGATION AND HEARING ON SILICON
METAL FROM CANADA

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

(AA1921-192)

SILICON METAL FROM CANADA

Notice of Investigation and Hearing

Having received advice from the Department of the Treasury on December 5, 1978, that silicon metal from Canada is being, or is likely to be, sold at less than fair value, the United States International Trade Commission, on December 15, 1978, instituted investigation No. AA1921-192 under section 201(a) of the Antidumping Act, 1921, as amended (19 U.S.C. 160(a)), to determine whether an industry in the United States is being, or is likely to be injured, or is prevented from being established, by reason of the importation of such merchandise into the United States. For the purposes of its determination concerning sales at less than fair value, the Treasury Department defined "silicon metal" as silicon metal, unwrought, containing by weight not over 99.7 percent pure silicon; and alloys of silicon metal, unwrought, containing by weight 96 percent or more but less than 99.0 percent silicon.

Hearing. A public hearing in connection with the investigation will be held on Tuesday, January 23, 1979, in the Commission's Hearing Room, United States International Trade Commission Building, 701 E Street, NW., Washington, D.C. 20436, beginning at 10:00 a.m., e.s.t. All persons shall have the right to appear in person or by counsel, to present evidence and to be heard. Requests to appear at the public hearing, or to intervene under the provisions of section 201(d) of the Antidumping Act, 1921, shall be filed with the Secretary of the Commission, in writing, not later than noon, Tuesday, January 16, 1979.

By order of the Commission.

Kenneth R. Mason
Secretary

Issued: December 18, 1978

APPENDIX C

STATISTICAL TABLES

Table 1.--Silicon metal: U.S. production, producers' shipments and intracompany transfers, imports for consumption, and apparent U.S. consumption, 1974-78

Year	Production	Producers' shipments and intra-company transfers	Imports	Apparent U.S. consumption 1/	Ratio of imports to consumption
	Short tons	Short tons	Short tons	Short tons	Percent
1974	132,492	118,711	18,975	137,637	13.8
1975	95,200	88,689	6,908	92,445	7.5
1976	138,829	128,606	9,387	136,754	6.9
1977	122,658	114,122	26,083	139,934	18.6
1978	118,146	128,607	34,475	158,539	21.7

1/ Computed by the U.S. International Trade Commission; includes adjustments for exports and changes in yearend stocks.

Source: Imports compiled from official statistics of the U.S. Department of Commerce; other data compiled from responses to questionnaires of the U.S. International Trade Commission.

Table 2.--Silicon metal: Reported U.S. consumption, 1/ by major end uses, 1973-77

(In short tons)

End use	1973	1974	1975	1976	1977
Alloys 2/	64,662	58,087	41,941	57,278	55,787
Silicones	3/ 34,054	3/ 37,502	26,375	41,229	41,624
Steel	3,034	3,357	2,181	2,282	2,384
Superalloys	84	89	42	67	65
Cast irons	85	41	24	29	57
Other	3/ 3,784	3/ 4,167	2,727	2,546	2,827
Total	105,703	103,243	73,290	103,431	102,744

1/ Reported consumption represents data published by the U.S. Bureau of Mines; such data are based on voluntary responses to questionnaires of the Bureau of Mines and appear to consistently understate actual domestic consumption of silicon metal.

2/ Excludes alloy steels and superalloys.

3/ Estimated; not separately available for silicones vis-a-vis other end uses.

Source: Compiled from official statistics of the U.S. Bureau of Mines.

Table 3.--Silicon metal: U.S. imports for consumption, by principal sources, 1974-78

Source	1974	1975	1976	1977	1978
	Quantity (short tons) 1/				
Canada	1,714	4	540	10,934	10,388
Yugoslavia	3,507	781	2,132	3,537	8,407
South Africa	0	2,015	3,115	4,353	6,657
Norway	7,417	2,231	3,328	5,367	4,959
France	3,223	1,787	174	288	2,042
Spain	68	0	0	1,288	1,558
Portugal	33	0	0	0	463
All other	3,013	90	98	316	2/
Total	18,975	6,908	9,387	26,083	34,475
	U.S. customs value (1,000 dollars)				
Canada	1,186	33	448	9,046	8,528
Yugoslavia	3,900	636	1,421	2,348	4,906
South Africa	-	1,263	2,018	3,133	4,528
Norway	5,635	1,799	2,408	3,999	3,522
France	1,702	1,658	118	229	1,319
Spain	93	-	-	911	1,011
Portugal	14	-	-	-	291
All other	3,522	249	70	277	5
Total	16,052	5,636	6,483	19,943	24,111
	Unit value (cents per pound)				
Canada	34.6	3/	41.5	41.4	41.0
Yugoslavia	55.6	40.7	33.3	33.2	29.2
South Africa	-	31.3	32.4	36.0	34.0
Norway	38.0	40.3	36.2	37.2	35.5
France	26.4	46.4	33.9	39.8	32.3
Spain	68.4	-	-	35.4	32.4
Portugal	21.2	-	-	-	31.4
All other	58.4	3/	35.7	43.8	3/
Average	42.3	40.8	34.5	38.2	35.0

1/ Silicon content of imports under TSUS item 632.42 and estimated silicon content (98.5 percent of gross amount) of imports under TSUSA item 632.8420. Prior to 1976, imports under this latter item included material other than the silicon metal included in the scope of this investigation. In the above table, imports of silicon metal under item 632.84 during 1974 and 1975 were estimated to be 83 percent of total imports under this item.

2/ Less than 1,000 pounds.

3/ Not representative.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 4.--Silicon metal: U.S. imports for consumption from Canada, by months, 1976-78

Month	1976	1977	1978
	Quantity (short tons)		
January	1/	189	767
February	0	513	958
March	0	1,030	904
April	0	937	618
May	0	1,255	1,334
June	0	1,199	530
July	0	494	896
August	0	1,146	602
September	0	1,040	664
October	60	942	978
November	324	896	876
December	156	1,095	1,259
Total	540	2/ 10,736	10,388
	Average unit value (cents per pound) 3/		
January	-	41.3	40.4
February	-	40.1	40.2
March	-	41.3	40.4
April	-	42.9	38.3
May	-	41.6	40.9
June	-	42.4	41.5
July	-	42.7	41.2
August	-	41.1	42.6
September	-	41.3	41.3
October	41.3	40.7	41.2
November	41.3	41.8	41.8
December	41.5	39.0	42.2
Average	41.5	41.4	41.0

1/ Less than 500 pounds.

2/ This total differs somewhat from that shown in table 3. The latter includes a revision made in the annual statistics by the Department of Commerce.

3/ Based on the U.S. customs value.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Note: Quantities shown are in terms of contained silicon.

Table 5.--Silicon metal: U.S. imports for consumption, by specified sources and by customs districts, 1977

Customs district	Canada	Norway	South Africa	Yugo-slavia	Spain	All other	Total
	Quantity (short tons)						
Boston, Mass	0	0	0	0	0	66	66
New York, N.Y	2,730	2,730	424	202	0	17	6,103
Philadelphia, Pa	0	0	115	0	0	16	132
Baltimore, Md	0	1,270	39	329	0	1/	1,637
Mobile, Ala	0	0	39	0	0	0	39
New Orleans, La	0	0	1,779	0	0	0	1,779
Houston, Tex	0	0	153	0	0	0	153
Los Angeles, Calif	0	0	0	832	0	0	832
Seattle, Wash	0	0	912	0	0	0	912
Chicago, Ill	0	1,407	1,098	2,052	1,308	0	5,864
Detroit, Mich	6,053	0	0	0	0	498	6,551
Cleveland, Ohio	0	0	0	166	0	0	166
Buffalo, N.Y	912	17	0	0	0	0	930
Ogdensburg, N.Y	1,137	0	0	0	0	0	1,137
St. Albans, Vt	55	0	0	0	0	0	55
Total	10,887	5,424	4,559	3,581	1,308	597	26,356
	Unit value (cents per pound)						
Boston, Mass	-	-	-	-	-	34.6	34.6
New York, N.Y	41.2	40.9	34.8	34.1	-	50.0	40.4
Philadelphia, Pa	-	-	36.9	-	-	32.6	36.3
Baltimore, Md	-	33.8	21.8	33.3	-	216.2	33.4
Mobile, Ala	-	-	20.8	-	-	-	20.8
New Orleans, La	-	-	34.6	-	-	-	34.6
Houston, Tex	-	-	35.1	-	-	-	35.1
Los Angeles, Calif	-	-	-	33.1	-	-	33.1
Seattle, Wash	-	-	33.4	-	-	-	33.4
Chicago, Ill	-	31.8	39.9	32.2	34.8	-	34.1
Detroit, Mich	40.7	-	-	-	-	42.1	40.8
Cleveland, Ohio	-	-	-	34.2	-	-	34.2
Buffalo, N.Y	38.5	41.8	-	-	-	-	38.5
Ogdensburg, N.Y	42.1	-	-	-	-	-	42.1
St. Albans, Vt	43.7	-	-	-	-	-	43.7
Average	40.8	36.9	35.5	32.8	34.8	41.4	37.7

1/ Less than 1,000 pounds.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 6.--Profit-and-loss experience of U.S. producers of silicon metal on all operations of the establishments or divisions within which silicon metal was produced, and on operations on silicon metal, 1974-77 and January-September 1978

Item	1974	1975	1976	1977	Jan.-Sept. 1978
	Total establishment operations				
Net sales and intracompany transfers----------1,000 dollars--	138,987	122,918	147,029	128,736	107,171
Cost of goods sold----------do----	105,694	105,150	133,881	122,324	100,524
Gross profit----------do----	33,292	17,767	13,148	6,413	6,647
General, selling and administrative expenses----------1,000 dollars--	5,944	7,625	9,463	9,278	6,864
Net operating profit or (loss)-----do----	27,348	10,143	3,685	(2,865)	(217)
Other income (expense), net--------do----	(1,100)	(1,098)	(509)	(627)	898
Net profit (loss) before income taxes----------1,000 dollars--	26,248	9,046	3,176	(3,491)	681
Book value of total assets 1/------do----	110,731	137,062	174,834	157,589	147,193
Ratio of net profit (loss) before income taxes to--					
Net sales and transfers-------percent--	18.9	7.4	2.2	(2.7)	0.6
Total assets----------do----	23.7	6.6	1.8	(2.2)	.5
	Operations on silicon metal				
Net sales and intracompany transfers----------1,000 dollars--	87,449	69,827	97,469	88,994	69,248
Cost of goods sold----------do----	63,859	59,691	88,980	84,236	64,122
Gross profit----------do----	23,590	10,136	8,489	4,758	5,125
General, selling and administrative expenses----------1,000 dollars--	4,041	5,378	6,281	6,202	4,071
Net operating profit or (loss)-----do----	19,549	4,758	2,208	(1,444)	1,054
Other income (expense), net--------do----	(1,223)	(648)	(339)	(367)	(227)
Net profit (loss) before income taxes----------1,000 dollars--	18,326	4,110	1,869	(1,811)	827
Ratio of net profit (loss) before income taxes to net sales and transfers----------percent--	21.0	5.9	1.9	(2.0)	1.2

1/ As of the end of the period shown.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Note.--Because of rounding, figures may not add to the totals shown.

Table 7.--Silicon metal: Range of prices and weighted average price of the product sold by U.S. producers to their largest customers, by silicon specifications and by quarters, 1976-78

(Cents per pound of contained silicon)

Period	Minimum Si = 98% Maximum Fe = 0.5%		Minimum Si = 98% Maximum Fe = 1%		Minimum Si = 98% Maximum Fe = 1% Maximum Al = 0.5%	
	Range	Weighted average	Range	Weighted average	Range	Weighted average
1976:						
January-March	44.10-45.75	45.31	41.75-42.86	42.40	42.50-43.50	43.24
April-June	42.57-45.65	44.99	41.75-42.50	42.09	42.50-43.50	43.19
July-September	44.10-50.62	45.47	41.68-42.50	42.14	42.50-43.50	43.27
October-December	44.10-49.59	46.38	41.69-43.50	42.19	42.50-43.50	43.20
1977:						
January-March	45.99-50.00	46.42	42.26-44.75	43.44	41.83-45.50	44.44
April-June	47.10-50.00	47.76	44.17-46.26	44.85	42.18-46.00	45.43
July-September	44.10-50.00	45.91	41.75-43.33	42.41	42.50-43.95	42.96
October-December	42.50-50.00	45.10	41.62-43.26	42.01	42.50-43.00	42.63
1978:						
January-March	44.10-50.00	45.40	41.50-42.50	41.79	42.50-43.51	42.63
April-June	44.88-50.00	45.46	40.10-44.75	42.59	42.89-45.50	44.62
July-September	42.00-50.00	48.05	43.40-45.49	44.64	43.00-45.50	44.98
October-December 1/	42.00-50.00	45.57	44.75-45.50	44.95	43.00-45.68	45.30

1/ No data reported by one producer during this quarter; one producer reported for October and November only.

Source: Data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 8.--Silicon metal: U.S. producers' list prices, by grades and by date of price changes, 1974-78 1/

Date of change	Grade	List price
	Maximum iron (Fe) content	Cents per pound
12-24-73	0.35% Fe	30.90
	.50% Fe	29.20
	1.00% Fe	27.00
3-27-74	.35% Fe	33.90
	.50% Fe	32.20
	1.00% Fe	30.00
5-29-74	.35% Fe	38.90
	.50% Fe	37.20
	1.00% Fe	35.00
7-22-74	.35% Fe	59.90
	.50% Fe	58.20
	1.00% Fe	55.00
10-14-74	.35% Fe	46.40-59.90
	.50% Fe	44.70-58.20
	1.00% Fe	42.25-55.00
2-21-75	.35% Fe	46.40-49.90
	.50% Fe	44.70-48.20
	1.00% Fe	42.25-45.00
3-25-75	.35% Fe	46.40-48.40
	.50% Fe	44.70-46.20
	1.00% Fe	42.25 2/
11-01-75	.35% Fe	45.40 3/
10-27-75	.50% Fe	No price listed 3/4/
3-25-75	1.00% Fe	42.25 3/
1-03-77	.35% Fe	46.40-49.40
	.50% Fe	44.70-47.70
	1.00% Fe	42.50-45.50
2-01-77	.35% Fe	49.40
	.50% Fe	47.70
	1.00% Fe	45.50
7-18-77	.35% Fe	46.40
	.50% Fe	44.70
	1.00% Fe	42.50

Table 8.-- Silicon metal: U.S. producers' list prices, by grades and by date of price changes, 1974-78 1/--Continued

Date of change	Grade	List price
	Maximum iron (Fe) content	Cents per pound
5-01-78	0.35% Fe	49.40
	.50% Fe	47.70
	1.00% Fe	45.50
11-01-78	.35% Fe	52.90
	.50% Fe	51.20
	1.00% Fe	49.00

1/ Date of price change is the same for all 3 grades unless other indicated; all 3 grades have a maximum calcium content of 0.07 percent.

2/ Range of prices of 42.24-42.50 was listed in Metals Week from 3-25-75 through the week of 5-12-75.

3/ Price in effect throughout 1976.

4/ Price listed as "nominal" in Metals Week.

Source: Metals Week.

[redacted]

Table 9.--Prices at which * * * purchased silicon metal, by countries and by quarters, July 1976-December 1978

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Table 10.--Prices at which * * * purchased silicon metal, by countries and by quarters, 1978

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